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ABSTRACT

This teaching guide is one of four documents published by the Houston Independent School District for teacher use in developing career education and career awareness in the classroom. Five occupational clusters (construction, manufacturing, transportation, agri-business and natural resource, and marine science) are used to develop career awareness for the high school student. Each cluster includes behavioral objectives and instructional procedures for the teacher. A series of job descriptions using newspaper articles, interviews, and cartoons provide resource material for the teacher and the student. A list of addresses is supplied for those wishing sources for further study. (JC)

OCCUPATIONAL ORIENTATION

PART 2

ED 094239

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HOUSTON INDEPENDENT SCHOOL DISTRICT
Houston, Texas
1973

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ED 094239

OCCUPATIONAL ORIENTATION

SECONDARY LEVEL

Curriculum Bulletin Number 73CBM2

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Published by

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Houston, Texas
1973

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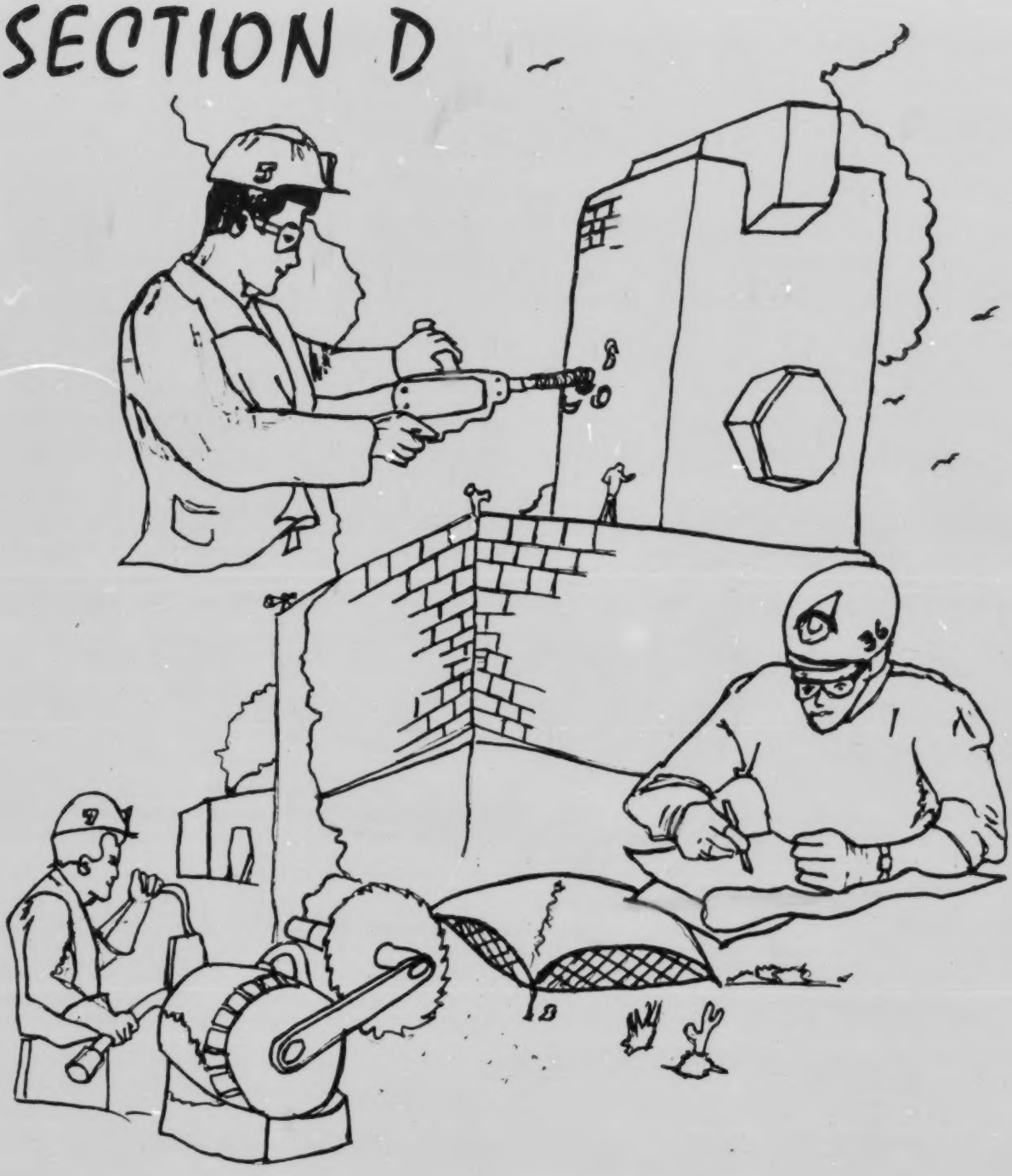
SECTION D



CONSTRUCTION OCCUPATIONS

CONSTRUCTION OCCUPATIONS

I. Behavioral Objectives

A. Eighty percent of students will draw a picture or write a paragraph about the teamwork of two or more construction workers.

B. Seventy percent of students will discuss new buildings which are being erected in Houston.

II. Instructional Procedures

A. The Houston area is expanding rapidly in commercial building. Students must be informed of current and future opportunities in local construction.

B. The home offices for several international builders are located in Houston. The advantages and disadvantages of the transient work in construction should be discussed.

C. Need to understand the other man's work in order to be a part of an effective construction team should be presented in a meaningful way. The pattern of teamwork may be emphasized strongly enough in this unit to carry over into other career fields.

D. Interest and ability should be recognized and encouraged in each student.

E. Advantages and disadvantages of unions should be introduced and discussed.

STUDENT ACTIVITIES

Students will complete two or more of the following activities:

1. Clip a construction picture from the newspaper. Put it in your scrapbook. Read the article or caption with the picture and explain to the class.

2. Bring to class a tool used in construction. Give the names of the tool and tell the class how it is used.

3. Join the Houston Area Woodcarver's Club or the National Woodcarvers Association. For further information and application blanks, call 649-0965 (1972).

4. Make a model of a house. Include as much detail as possible.

5. Make a floor plan of a house.

6. List the kinds of craftsmen needed to build a house.

7. Interview a construction worker. Write or record the advantages and disadvantages of his work. Find out the qualifications needed for his job. Learn where to apply for construction jobs.

8. Give a three-minute report on current apprenticeships. You will be able to get information by calling the Texas Employment Commission, by writing the U. S. Department of Labor, or you may inquire at the offices of local contractors or local unions.

9. In the yellow pages of the telephone directory, find names, addresses, and telephone numbers of three contractors. Copy them in the Construction Section of your notebook.

10. Cut out from newspapers or magazines three or more want ads asking for construction employees and paste in your notebook.

11. Give a two-minute report on construction jobs being taught at Job Corps centers. Call your Texas Employment Commission for free pamphlets.

12. Ask a friend or a relative about construction jobs in the Armed Forces. Pretend you are a recruiter telling the class about the opportunities for construction careers.

13. Write a page about a plumber's salary, job requirements, and qualifications.

14. List the duties and qualifications of a cement mason. Include his current salary.

15. Report to the class the duties and salaries of a painter—both union and non-union.

16. List the steps taken by a bricklayer as he advances in skills. Give average salary at all levels of ability.

17. Give five safety rules for construction workers.

18. List jobs an electrician might do. Include places of training.

19. Collect newspaper or magazine want ads advertising for an apprentice, a journeyman, and a master. Put the clippings in your notebook.

20. Locate the names, addresses, and telehone numbers of three or more construction groups; for example, plumbers, bricklayers. Copy this information in your notebook.

21. Draw or cut out magazine pictures of three or more of the following: plumber, electrician, bricklayer, roofer, cabinet maker, tile setter, painter, carpenter, architect, contractor, paper hanger.

22. Explain in writing the duties of a sub-contractor. Call a local contractor for information.

23. Clip newspaper articles that indicate where and when new buildings will be erected.

24. Make a poster with *construction teamwork* as your theme. Include as many crafts as possible.

25. Invite a construction worker to class. Check with your teacher for approval before setting a definite date.

26. Attend a union meeting. Take notes and share your findings with the class.

27. Visit an apprenticeship school. Call Mr. Charlie Farley, 522-9845 (1972) for names, places, and times to plan tours.

III. Performance Goals

A. Collection of newspaper clippings on current and future construction opportunities

B. Interviews of leaders and/or workers in construction

C. A hobby involving some phase of construction

D. Needs of teamwork as shown through completed models, drawings, or other activities

IV. Evaluation

A. Oral and written class participation

B. Completion of student activities

C. Summation of information in career field of construction. See wheel in appendix.

Flexible Daily Lesson Plans

First Day—Introduction

Media presentation (See appendix.)
Distribute activity sheets to students. Discuss and make assignments.
Refer students to materials in career corner and on bulletin boards.
If time permits, use "Construction People" and other activities in the appendix.

Second Day

Guest speaker or study tour (See appendix for lists.)

Third Day—Current Happenings and Planning

Use newspapers, magazines, pamphlets, and appendix for materials relating to construction.
If time permits, allow a portion of the period for preparation of activities by the students and for giving assistance.

Fourth Day—Student Activities

Individual and group presentations of students
If time permits, involve students in a construction company improvisation; for example:

> *You are the foreman. A non-English speaking craftsman is new on the job. He knows the tools, has quick, neat work habits, and is an excellent craftsman. His inability to speak English annoys the other workers, and they have begun to slack off in production. The only unity in the crew now seems to be built around a dislike for the new worker. How would you handle the problem?*

APPENDIX

1. Interdependence Chart

2. H.E.W. Chart

3. Stories, Data, Activities*

4. Want Ads

5. Predictions

6. Resources

   a. Study tours
   b. Speakers
   c. Media
   d. Printed Materials

7. Summation Wheel

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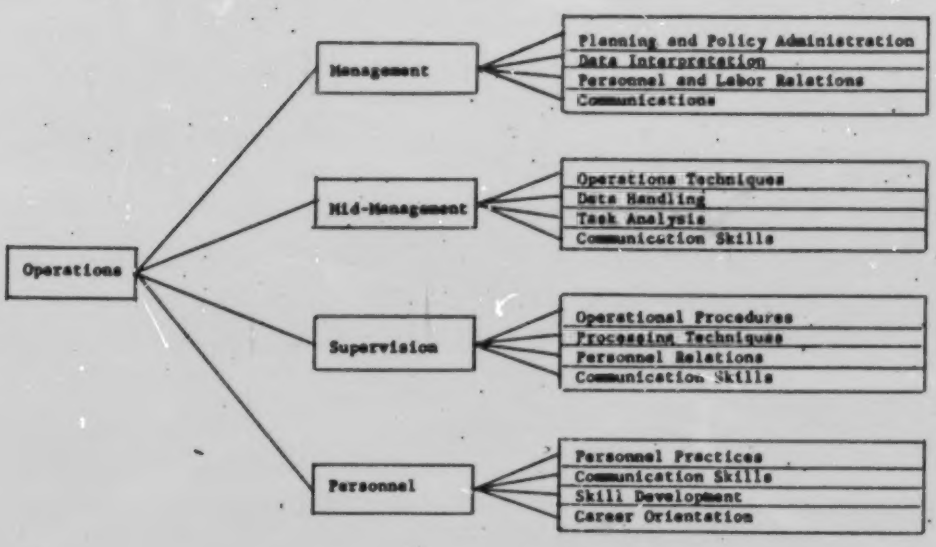
*This may vary with specific subjects in the different careers

CONSTRUCTION — Interdependence — Examples of a Few People and Places

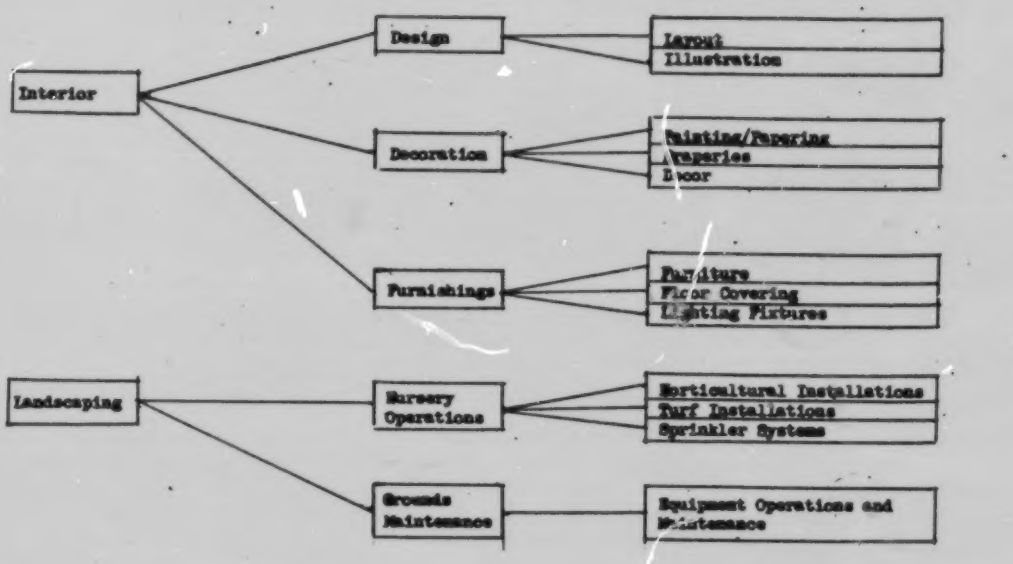
Needs	Careers	Places of Employment
Many apartments — Why? Increase in urban jobs International builders — Why? Move of central offices to Houston Local office complexes — Why? New and old business seek space Shopping centers — Why? Expansion of suburbs	Plumber Electrician Bricklayer Carpenter Painter Cement mason Roofer Contractor Sub-contractor Cabinet builder Tile setter Architect Paper hanger Lumber salesman Hardware salesman Plumbing fixtures salesman Paint supply salesman Real estate developer Real estate salesman Wire salesman Light fixtures salesman Gravel salesman Heating and air conditioning installer	Union construction company Non-union construction company Wholesale supply houses Retail stores Union plumbing contractors Non-union electrial contractors General contractors Roofing companies Tile contractors Non-union paint contractors Architectural firms Real estate agencies Land development agencies Lumber yards Brick yards Gravel pits Heating and air conditioning firms Non-union plumbing contractors Union electrical contractors Union mason contractors Non-union mason contractors Non-union paint contractors Union title contractor Non-union tile contractor

CLUSTER FOR CONSTRUCTION

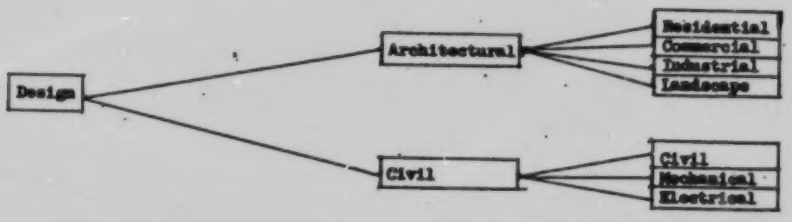
Operations



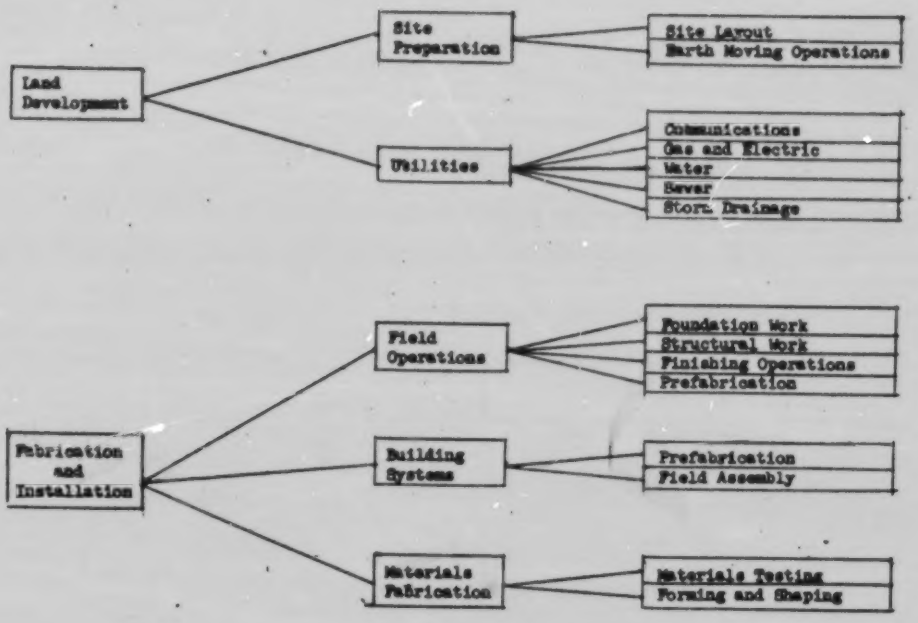
Interior and Landscaping



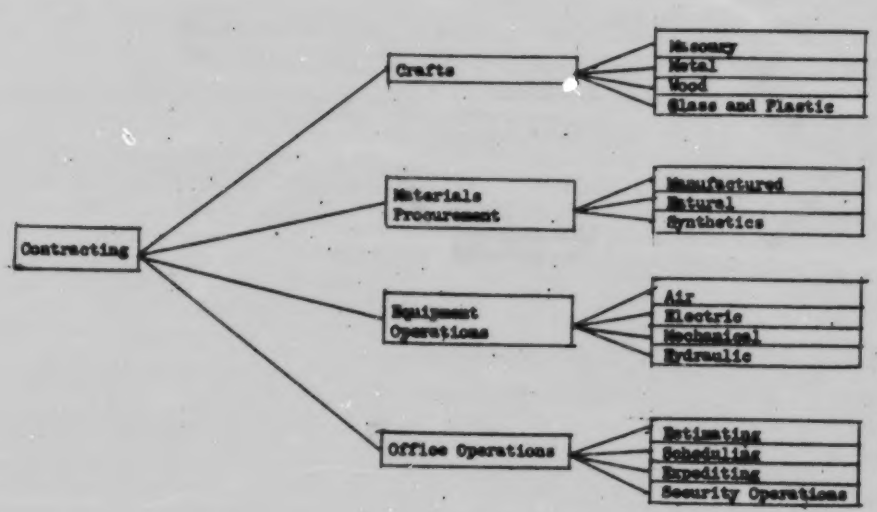
Design



Land Development
and
Fabrication and Installation



Contracting



The General Contractor

From *Associated General Contractors of America*, 1957 E. Street, Washington, D. C. 20006.

LET'S TAKE A CLOSER LOOK AT THE MANY POSITIONS AVAILABLE WITH A GENERAL CONTRACTOR

Project Manager: Directs all construction functions on very large projects; establishes and develops methods, procedures, schedules and policies; coordinates the work of all units and divisions; and performs such administrative duties as are required for proper completion of the project.

General Superintendent: Directs all construction functions for large projects, according to established schedules, specifications, methods and procedures; supervises job superintendents on very large projects or on a variety of smaller projects.

Job Superintendent: Directs all construction functions on small or medium size projects, or on specific phases of large projects. Responsible for maintaining proper schedule, budget methods and procedures.

Office Manager: Performs or supervises variety of services related to responsibilities of the construction business, such as keeping books, making up payroll, billing clients, handling mail.

Engineer: A sampling of the technical responsibilities of the construction engineer includes design, testing, analysis, planning, surveying, materials handling, research and other technical aspects of the building process.

Estimator: Obtains basic data concerning a proposed construction project (usually from plans and specifications) including quantities of materials, man-hours to perform items of work, methods to be used, equipment required, and with the assistance of other members of the office staff computes the cost of construction, which represents the contractor's competitive bid for the job.

Expediter: Maintains construction schedules by reviewing deliveries, scheduling arrival of materials and men at job sites, establishing priorities and obtaining clearances.

Draftsman: Prepares working plans, drawings and diagrams for engineering and construction purposes.

Foremen: Supervises all journeymen of his particular trade on a project. Plans work, maintains schedules, assures proper procedures as directed by the superintendent.

Journeymen: Carpenter • Bricklayer • Equipment Operator • Iron Worker • Electrician • Cement Finisher • and others. As a skilled tradesman, he is engaged in, and performs, the work of his craft as directed by his foreman.

Apprentice or trainee: Many of the above positions are attained by first becoming an apprentice or trainee. A high school graduate starting out as an apprentice in any of the many trades serving the construction industry earns while he learns. And depending on the trade, he will become a journeyman or skilled worker in from 2 to 5 years.

Other Positions Include: Purchasing Agent, Safety Engineer, Timekeeper, Accountant, Bookkeeper, Clerk, Stenographer and others.

General Contractors and their organizations normally specialize in one or more of the following types of construction:

General Building Construction: Skyscrapers, office buildings, apartments, plants, schools, hospitals, churches, government buildings . . . virtually every type of shelter needed by man.

Highway Construction: Highways and the many related facilities such as bridges, grade separations, culverts, paving, earthmoving, traffic controls and landscaping.

Heavy Construction: Tunnels, airports, dams, missile bases, railroads, and flood control projects.

Utilities Construction: Pipeline installations, sanitation projects, water works, and other utility needs of a country, city or community.

The Painter

From *Associated General Contractors of America*, 1957 E. Street, Washington, D. C. 20006.

Sure, you might have to take a little ribbing at first from your friends. After you start on a job as a painter, some people will always ask whether you paint "still life" or "portraits," and whether or not you've met Michelangelo yet. That's when you hit 'em between the eyes with the facts. Like there are over 10,000 openings for painters every year in the home building industry, and that a painter gets high pay while working in an active, growing business. Not only that, but you can always count on a job. That's when your friends stop kidding and start listening.

Today's housing industry is truly big business, and it has an ever-increasing demand for skilled craftsmen in the various trades. One of the most important jobs belongs to the painter. Running a brush or a roller over a wall surface may not sound like too much of a challenge, but there's a lot more to painting than just painting. Walls have to be treated before they're painted. Sanding makes them smoother; so does filling the holes and dents left by nails and the hammer when wallboard was put up. And cracks in plaster will show through paint, unless they are patched. Only after the walls and woodwork are really ready, does the painter actually pick up the brush.

There are other things to remember. Indoor paint is chemically different from the paint used outdoors. Oil-base paint won't mix with water-base paint. The job of matching colors takes skill. Working outside, painting a finished home or apartment, usually means climbing around on ladders and scaffolding. That's no place for someone who's irresponsible or clumsy.

Getting started as a painter isn't really hard. As a matter of fact, you can start just about anytime you want—even during summer vacations from school. Many painters begin by working on a job with experienced men and learn the trade as they earn a living. Some get the experience they need by joining government job programs, or by getting into formalized apprentice training jobs with local contractors. Most apprentice programs in the painting trade last about three years. There's a lot to learn. During the day as a trainee you get on-the-job experience from a working journeyman. *And you get paid for it!* You make a good living wage with regular raises.

One or two nights a week, there are also classes where apprentices can learn the skills they don't have time to learn on the job, such as estimating or ordering materials.

When "school" is out, the trainee painter becomes a practicing journeyman. Pay jumps higher, and so does the demand for the painter's skills. Many new journeymen will continue to work for general contractors or painting subcontractors. Others, because of the many opportunities available in the industry, will go into business for themselves. There's nothing like being your own boss, if you want to do it that way.

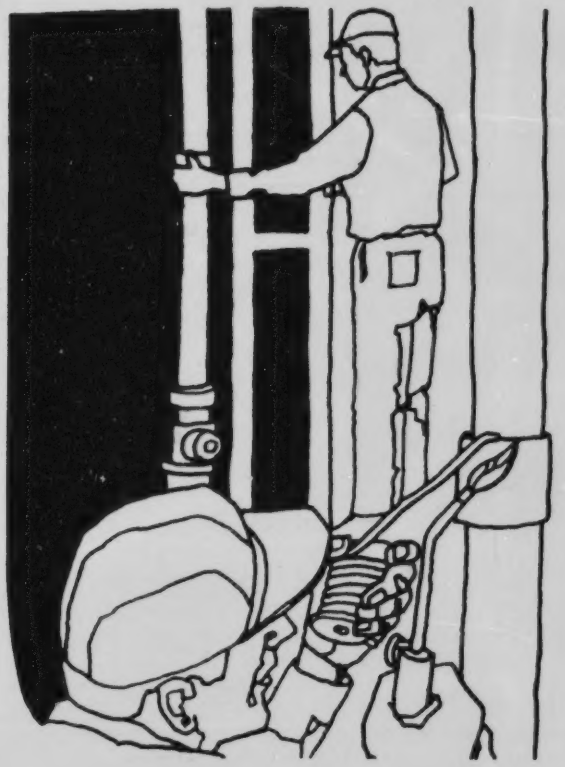
The Plumber

From *Associated General Contractors of America*, 1957 E. Street, Washington, D. C. 20006.

The plumber is a skilled craftsman with a heavy responsibility. When a new home is built, water and gas systems must be made to last and to give trouble-free service. This makes the plumber one of the most important members of the homebuilding team.

He uses hand tools and is familiar with the ways to bend, thread, and solder pipe. The plumber knows how to test for leaks by filling finished systems with water or air that is pressurized. His tools include wrenches, saws, drills, and the blowtorch, among others. There are also many power tools at his disposal to make work on the job easier.

Installing and maintaining water and gas systems and hooking up heating, refrigeration, and waste disposal fixtures are just a few of the jobs the plumber may do while a new home or apartment building is being built.



But, there's a problem. The housing industry in the United States can't seem to find enough plumbers to handle the work that's available. By 1978 there will be openings for 90,000 new plumbers; today, the industry is training only enough men to fill a third of these jobs.

The industry needs more trained plumbers now. The pay is excellent. Most are making more money than they could in any other local industry. All this pay means security, both for the plumber and his family. And it means they can enjoy many leisure-time activities.

As in many other industries, employers offer extra benefits just to get and keep good men. Some have paid vacation arrangements and health insurance.

Getting started isn't too hard. Plumbers begin by going through a training program, learning the trade as they work on actual jobs, and getting paid for it. Even the training pay is good, about half what the working journeyman makes. And there are regular increases, until the trainee finishes learning the skills he needs to become a journeyman.

Usually, apprentice plumbers start training between the ages of 16 and 25. They begin working side-by-side with an experienced plumber on local building jobs. Others may enter pre-job-training programs offered by the government, trade schools, or local jobs sponsored by joint apprenticeship committees.

After finishing training, many plumbers take jobs working with plumbing contractors. Some may go into business for themselves. But, the demand for trade skills is so high that a good plumber will always find steady work, during all seasons of the year, and for high pay.

The Electrician

From *Hands to Build America*, Associated General Contractors of America, 1957 E. Street, Washington, D. C. 20006.

Mike Sweeney's an electrician. He's on the job at eight in the morning. And today, the job's a big one. Mike and his crew will completely wire two houses. Mike must install wiring corresponding to detailed plans that show where circuits will go, how many outlets will go in each room, how much power will get to the kitchen area. It's a job with a lot of responsibility.

Two weeks ago, the subcontractor he works for told Mike to order the materials for today's job. That meant looking at a floor plan for each house, measuring the distances to each room from the main fusebox, and deciding just how many light fixtures, outlets, and switches should be purchased.

Mike called the supplier. Because he knows his job, Mike was able to order exactly the materials he needed. Now he and his fellow electricians are starting to install the "nerves" of the house—the wires which will carry power to every light and appliance.

They work with hand and power tools. With a power drill they bore holes through the wooden joists where the cables will pass, and they use a cement drill to make holes in the masonry wall of the foundation where the main fusebox will be mounted. Cables are already being strung through the wall studs and ceiling rafters for light circuits, and Mike is installing a 220 volt outlet for a clothes dryer and electric freezer in the basement.

Cables are cut, and wires trimmed so that they may be attached to light switches or electrical outlet boxes. This involves the use of wire-cutters, saws, and other hand tools. The work must be done carefully, because an improper connection could cause a fire. Mike's certification as an electrician proves that he knows how to install wiring safely, according to the wiring codes and regulations that apply in his community. He had to pass a safety test to get this certificate.

Mike was fresh out of the Army when he got started in the industry. It felt a little funny at first, working with other guys who had just finished high school. But there was so much to learn that Mike soon forgot about the age difference. He earned while he learned. The pay came for his work as an assistant to a journeyman during the day. One or two evenings each week, Mike attended a couple of hours of class to learn more about his job. The pay, even while he was learning, was good.

Even though Mike got his start in an apprentice program, there are many ways of entering the industry. Some men begin just by going to work for a local contractor. Working side-by-side with more experienced men, they can learn the fundamentals of being an electrician over a period of many months. Others can start working whenever they choose because of past trade school class or summer job experience.

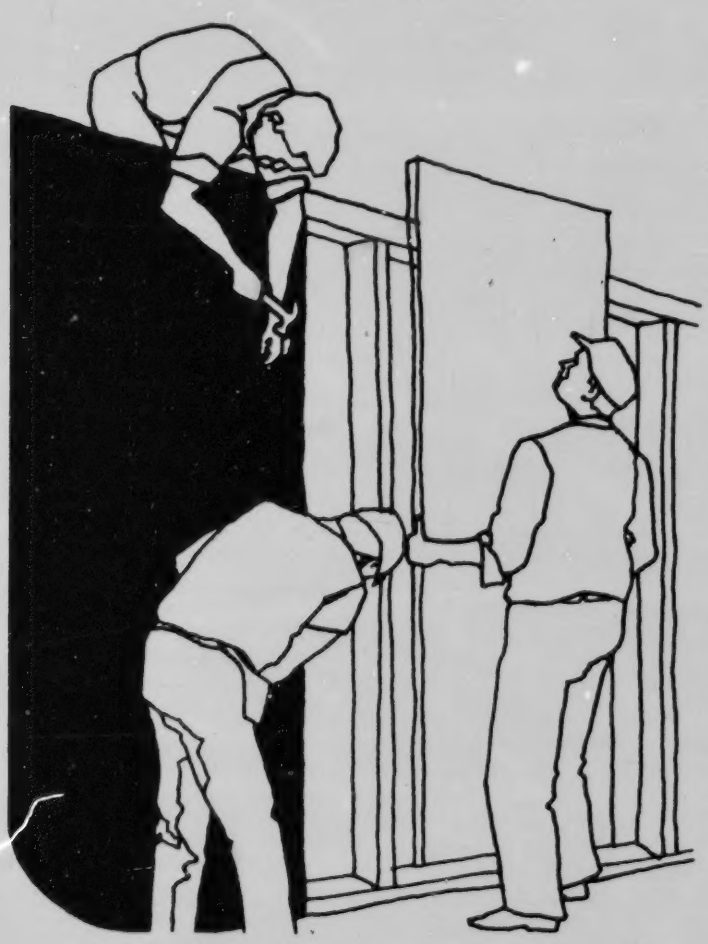
Mike was lucky to be able to have an apprentice education. He learned more than enough to insure rapid personal advancement.

The Carpenter

From *Hands to Build America, Associated General Contractors of America*, 1957 E. Street, Washington, D. C. 20006.

Not many other jobs can match it. Working outdoors with your hands, helping to build homes for people . . . . It is a satisfying way of living. A carpenter is just one of the team of skilled craftsmen who do the job. But he's one of the most important members of the team, because the range of skills he knows are found in every stage of construction. Take a look at just a few of the jobs the carpenter will do while building the average home.

He erects the wooden framework of the building on the foundation, he installs the subflooring and supporting joists, he puts up the studs for inside walls and makes the rafters for the roof.



When other craftsmen have added their contributions, the carpenter steps back in to finish his job. He puts in the stairs, the wood paneling, the window frames. He installs the doors and the hardware. He puts down hardwood floors and installs decorative molding trim.

Tools are important to the carpenter. In addition to modern power saws, drills, and nailing machines, he must be able to use the hand saw, the miter box, and the wood plane. He has to know when to use nails and when to use screws. Above all, the carpenter is a meticulous craftsman who carries on centuries of tradition by taking pride in his work. Every finished job is done to the best of his ability and represents the integrity of his trade.

Carpenters' pay is good, well ahead of most factory or local industry jobs. It provides a good living, with plenty of extra money for leisure-time activities. For you it can be money in the bank for the "rainy days" or for the things you've always wanted to buy.

And carpenters are in demand. They're needed everywhere. By 1975 the housing industry in this country will need 165,000 new carpenters, but they aren't being trained fast enough. So, there's a lot of room for men who want to grow with the industry.

There are lots of ways to get started in carpentry. Apprentice training programs sometimes are available through local joint apprenticeship committees. Other young men get started by hiring on with a local contractor and working side-by-side with an experienced carpenter until they learn the craft.

And there are state and federal training programs, including the Job Corps and "Outreach" plans.

Trainees get paid while they learn. That's right. You earn while you learn. Pay scales as a trainee are about half what the regular working carpenter makes, but there are regular raises.

Carpentry takes apprentice work

By JOYCE LAIN KENNEDY

Dear Joyce: I am a young man 21 years of age. I know what I want to be — a carpenter, but don't know how to become one. I quit going to college on a full-time basis because I want to work with my hands. I know no one who is a carpenter and do not know where to turn for experience. Experience seems to be the only requirement. How does a young man get into a trade for which there is no schooling?—J. M,. Kansas City.

Career Corner

MOST TRAINING authorities say it's best to learn the whys and wherefores of carpentry through apprentice training programs. These programs —four years in duration — combine on-the-job training with basic instruction in the trade.

Whether on the job or in the classroom, the apprentice receives a regular hourly wage, which is a percentage of the journeyman's rate, plus fringe benefits. As you stay in the program, pay increases — normally every 6 months.

Before you are accepted in a carpentry apprenticeship program, you will be tested and interviewed to determine if you are in good physical shape, and hve a sense of balance, manual dexterity, an eye for straightness of line, and are "quick at figures."

Apprenticeship programs usually are run by management and labor together. In many areas, joint apprenticeship committees (3 persons from labor, 3 persons from management) test, select and sign up apprentices. Joint apprenticeship committees also supervise and evaluate the apprntice's work experience and certify him as a journeyman after he has satisfactorily completed his training program.

Information about apprenticeship openings — for all crafts — is available from local state employment service offices, state apprenticeship agencies, and Apprenticeship Information Centers operated by the U.S. Dept. of Labor. Or, for carpentry, you may inquire at local carpentry contractors or general contractors; a local union of the United Brotherhood of Carpenters and Joiners of America (national headquarters address is 101 Constitution Ave. NW, Washington, D.C. 20001). For all crafts, you can also write to the Bureau of Apprenticeship and Training, U.S. Dept. of Labor, Washington, D.C. 20210.

Houston Chronicle
August 1, 1972

Dallas' Woman Carpenter Likes $4.28 Per Hour

Dallas (AP) — Darlene Wisdom, 23, of Ferriday, La., has been sworn into Carpenters Local No. 198 as the only dues-paying woman carpenter in the city.

"I kinda like the pay," she says of her $4.28 an hour.

"It's a good trade, too. Some day, when I get good enough, I want to build my own wooden house somewhere up in the mountains."

After completing a four-year apprenticeship, she will receive at least $7.17 an hour and become a full-fledged journeywoman carpenter.

The Bricklayer

From *Hands to Build America*. Associated General Contractors of America, 1957 E. Street, Washington D.C. 20006

On Saturdays, you'll find Mike Ibertsen out on the dragstrip. He's been building and racing cars ever since he was a senior in high school. He's a good mechanic.

But on Monday morning, Mike trades his wrenches for a trowel and a pointing tool. Mike's a bricklayer. Right now, he's working in a new residential development where many of the homes will be partially built of brick. Mike's boss is a masonry subcontractor who bid on this particular job, and Mike is the foreman. He supervises the work of sixteen other men.

Of course it wasn't always like this. When he was fresh out of high school, Mike wanted a job that didn't require a college education. Because he liked the outdoors and wanted to work with his hands, the choice narrowed to a career in the building trades. Mike went to work for a local contractor, tried bricklaying, and liked it. Four years of work as a journeyman's assistant followed. During that time, Mike learned that the history of bricklaying is a long one with a lot of tradition. He also found out that bricklaying isn't as easy as it had looked when he had seen other men working with brick on local building projects.

Mike learned the proper way to mix mortar, and the strange things that cement can do in heat or cold. He was taught how to trim brick and concrete block to size by using the bricklayer's hammer. The pointing tool became familiar. It's the little spoon-like instrument that trims the wet mortar between two rows of brick, leaving a nice even, decorative indentation. Mike learned the responsibility for maintaining his tools, of being sure that they were always clean and ready for use. But most important, Mike learned how to work with others, how to mesh his skills with those of all the other building craftsmen to create a finished home.

The pay, even while he was learning, was great. Now Mike is making even more money as a journeyman and foreman on the job—much more than he could after the same amount of time in other local industries. He works pretty hard each day, supervising the work of others and laying brick himself. But Mike enjoys it. Ask him about bricklaying, and he'll tell you, "It's healthy, and I'm doing just what I want to do." And after every job is finished, he has the satisfaction of knowing that he's helped to build a home that someone will be living in—and that he built it well. Every day on the way to work, Mike passes hundreds of other homes and apartment buildings with walls of brick that were set by Mike Ibertsen and his crew. You might call that kind of a trademark.

Bricklaying's not the easiest of jobs. It's a skill dating from before the time of the Romans. It's a job that demands dedication. It's a job for a man!

More information about careers in the housing industry is available right in your local community. Talk to your school guidance counselor or local

ELECTRICIAN*

Many electricians are needed to fill job openings in Houston.

I know about these openings because I'm a building contractor. I hire electricians to work for me. Right now I could use another whole crew of electricians. I just can't get enough good electricians to do the work on the buildings we have contracted to build.

Most electricians like their work, and they get paid well. The wages run from around $4.00 or more per hour. Sometimes the workers have to be out in the heat or cold, but many fellows like to work both indoors and outdoors. In this business you are on the move.

An electrician usually buys his own set of hand tools. They cost about $100. I supply the bigger, heavier tools. He has to be good at using these tools to install electrical circuits in the framework of new buildings. He has to read blueprints and follow instructions very carefully.

There is always danger of electrical shock so he can't goof off. He must always obey all safety rules or he can kill himself or others. He also has to be careful while climbing ladders, walking on scaffolds, and using his tools. An electrician often gets dirty while working on the construction site. He has to work in cramped or noisy places. If this crowded space and exacting work bother him, he can't be a good electrician.

An electrician should have good vision and he cannot be color blind because wiring is color-coded. He should be able to use his hands and fingers easily and be alert. Electricians must know and follow national, state, county, and city codes. He is usually tested on his knowledge before he obtains his electrician's license. An inspector is constantly checking his work. Lives depend on it.

New fields of electricity and electronics, as well as booming construction, offer many opportunities for young people who want a future in electricity.

I have the jobs waiting. So do my other friends who are contractors. Many jobs for electricians are also available at plants and factories. We all depend on electricity more and more each day in our homes, industries, and businesses.

Now we need many really dependable electricians. I'd like to hire you when you graduate from high school. Are you interested? If you are, make plans now.

Take some shop courses to help you when you become an electrician. Math, science, and drafting and schematics have to be taken seriously in a field like electricity. It brings great gifts or death—a lot depends on you.

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*This story is not original. The author and source are unknown.

What did you learn?

Beginning Wage _____ per hour

Preparation:

High School Subjects: _____ _____ _____

_____ _____ _____

Training after high school

Private Schools: _____ Yes _____ No

Junior College: _____ _____

Program Name of Nearest College with Program

Four-Year College: _____

Name of Nearest College with Program

Apprentice Program: _____

Name and Address of Local Joint Apprentice Committee

CARPENTER *

The construction industry is one of the fastest growing career fields in Houston. Business and industry are expanding and many people need new homes or apartments.

One of the most important workers in the construction industry is the carpenter. There just aren't enough good carpenters to go around. Experienced carpenters can find a job almost anywhere in Texas, but since Houston has wide open spaces surrounding it, building is going on rapidly in the area of this port city.

Besides the *general carpenter*, there are two other kinds of carpenters. They are the *rough carpenter* and the *finish carpenter*.

The *rough carpenter* cuts, fits, and builds the wooden framework and sub-floors for buildings. He builds forms, scaffolds, and installs heavy frames.

The *finish carpenter* goes to work when the basic wooden construction is completed. He does many things, such as putting on trim, molding, paneling. He also builds windows, floors, cabinets, and stairs.

The *general carpenter* does all the jobs necessary. He works with many materials other than wood.

To be a good carpenter you must have good general health and should have above average strength and use of arms and hands. A carpenter must enjoy working with tools. He needs a high degree of manual dexterity, and he must be able to follow directions. His foreman or supervisor may give oral directions or he may have to read plans and blueprints. A person who wants to be a carpenter should take math and drafting or some shop and science courses while he is in high school. They will help him read a rule and read blueprints, and will aid him in many ways when he becomes a carpenter. He must figure accurately or be will run up big bills for the contractor. If that happens, he will soon be out of work.

The carpenter usually works outdoors in the heat or cold. Sometimes he may lose working time because of the weather. He sometimes must climb or work in many different positions. There is some danger of injuries from tools, equipment, materials, or activity. Most experienced carpenters are careful and have good safety records.

The pay for an experienced carpenter averages about $4.50 an hour for a 40-hour week. Sometimes the carpenter begins his workday early in the morning. Occasionally, he must work overtime to finish a job or make up lost time because of bad weather conditions. When this happens, he is paid extra. Overtime pay is usually one and a half times the regular pay.

A person who wants to become a carpenter can begin while he is in school. You can make four-year plans of the courses that will be of value. The Home Builders here may offer suggestions that will help you prepare for this occupation.

After completing school, you may become a carpenter by getting on-the-job training or by entering an apprentice program. This includes work experience and related knowledge. The apprentice gets paid about half the journeyman carpenter's wage to start, but he usually gets a raise about every six months as he progresses.

Many jobs will be available for young men in construction. You may even want to go into your own contracting business. The outlook for carpentry is good for many years to come.

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*This story is not original. The author and source are unknown.

What did you learn?

Wage Scale: _____ per hour

Preparation:

High School Subjects: _____ _____ _____

_____ _____ _____

Do you know of construction courses after high school?

Private Schools: _____ Yes _____ No

Junior College: _____ _____

Program Name of Nearest College with Program

Four-Year College: _____

Name of Nearest College with Program

Apprentice Program: _____

Name and Address of Local Joint Apprentice Committee

CONSTRUCTION WORKER I AND II*

Call me Joe. I am one of the fellows who helped to build the shopping center down the street. I like my job. I am a construction worker.

There are a lot of job openings in the Houston area for construction workers. Why, my company alone needs at least a dozen more dependable workers. That's why my boss wants me to tell you about my job.

The thing I like best about my job is that I am working outside most of the time. Sometimes the weather is bad, but I enjoy being outside during different seasons of the year.

I do a lot of different things on my job, too. This makes my work interesting. I help several of the journeymen. They are the skilled workers, such as carpenters, electricians, and brickmasons. Sometimes I have to keep them supplied with materials. Sometimes I am loading or unloading materials, working with tools and equipment, or operating machinery.

A construction worker has to be strong and healthy. He must be able to do heavy work. I do a lot of lifting, carrying, pushing, pulling, bending, and walking. Sometimes it is dangerous, but I am careful and I obey the safety rules. You noticed my boots with steel toes and I always wear my hard hat. I have shatterproof goggles here in my pocket. I wear them to protect my eyes. You must have a good sense of balance because sometimes you will work high above the ground on some jobs.

I usually work 40 hours a week, but sometimes I work overtime to finish up a job or make up time lost because of the weather. The pay is good, too. I have been with this company a few months and I make $3.05 an hour. I think the average wage for construction workers who are union men is a little better than $3.20 an hour. I work for a non-union company.

Soon I am getting a chance to sign on as an apprentice in the work I like best. I will get paid for working while I learn. When I finish the apprenticeship, I will be paid as a journeyman. I think it's a good deal! Some day I even hope to move up to a master.

My boss needs new men, especially those with education and training. If you think you would like this kind of work, maybe you need to put a Trade and Industrial program in your four-year plans for high school. When you graduate and do go to see my boss about a job, tell him Joe sent you. O. K.?

What did you learn?

Wage Scale: _____ per hour (Union) _____ per hour (Non-union)

Preparation:
High School Subjects: _____ _____ _____

Do you know of any schools that teach construction after high school graduation?

Junior College: _____ _____
Program Name of Nearest College with Program

Four-Year College: _____
Name of Nearest College with Program

Apprentice Program: _____
Name and Address of Local Joint Apprentice Committee

*This story is not original. The author and source are unknown.

DRAFTSMAN*

Tim was looking through the newspaper one evening. As he turned to the classified pages, a want ad caught his eye. It read like this:

> DRAFTSMAN—Sharp young man with drafting experience and training. Excellent growth opportunity. Company will pay half on future education. $450-$550. Call 273-8641.

Tim read the ad twice—then thought to himself. "say, this sounds like something for me." He knew that Mr. Abrams, his drafting teacher at high school, would help him check on the company offering the job.

Tim didn't have enough money to go to college. Since his father had died, he had to help his mother by working part-time at the grocery store. It was not just the money problem. Tim had thought about his future quite often and he had decided that he would be happier if he could get technical or on-the-job training.

He was a good student in drafting and made good grades in math also. He wasn't sure just what he wanted to do, but he thought about becoming a draftsman. However, he didn't know where to go for training. When he saw the ad in the newspaper, it looked like a winner.

"The ad said . . . With experience and training . . . "He thought, " I wonder if my two years in high school drafting will count."

He decided to call for an appointment for an interview. He asked for the personnel director. He politely but briefly gave his name and the purpose of his call. After hearing Tim's explanation of his school training, the personnel director told Tim to come for an interview the next day.

Tim planned for his interview. As he dressed, he tried to remember some of the things he had learned about an interview back in the occupational orientation class. "I remember I played the part of the personnel man in a skit one day," he thought. "Well, today I'll be on the other side of the desk. Mmmm . . . sure glad we practiced for an interview. Now, I know what to expect."

During the actual interview, the personnel director was impressed with Tim's sincerity, his neat, courteous manner, and his school record. He hired Tim and told him he would begin by assisting one of the company architects as a tracer. His salary would begin at $450 per month. He would receive one week's paid vacation, several paid holidays. Hospitalization and insurance would be paid for by the company.

The biggest fringe benefit was that the company would help pay his expenses and buy his drafting equipment if he would take the drafting courses offered by a school nearby.

Meanwhile, as he gained skill and experience, he took on more responsibility as a junior draftsman and finally as a draftsman on the job.

Also, his pay and vacation increased as he gained experience. He could expect to be making well over $500 a month in a few years.

Tim learned that his better-than-average grades in math, physical science, and occupational courses helped him get the job. These courses are of real value to a draftsman. He often must translate measurements, specifications, ideas, and rough sketches of engineers, architects, or designers into working plans. Draftsmen use compasses, dividers, scales, protractors, triangles, drafting and printing machines, and many other instruments in making their drawings.

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*This story is not original. The author and source are unknown.

Tim was on his way to becoming a draftsman for a construction firm. Manufacturing industries that make such things as machinery, electrical equipment, fabricated metal products, and transportation equipment need draftsmen. Also, engineering, architectural consulting firms, and public utilities are looking for qualified draftsmen. Federal, state, and local governments also hire draftsmen for highway and public works projects.

Do you like to draw models? Are you good at math? Maybe you would like to be a draftsman someday. You should try to become as well qualified as Tim was when he graduated. Talk to a draftsman, visit a company that hires draftsmen, or sit in on a high school drafting class to see what you think about drafting. Keep up the good grades, also, especially in science and math.

Talk to young men like Tim. He'll tell you to "try it and you'll like it."

What did you learn?

Beginning Wage Scale: _____ per month

Fringe benefits: _____

Preparation:

High School Subjects: _____ _____ _____

_____ _____ _____

Name nearby schools that offer drafting courses after high school graduation?

Private Schools: _____ Yes _____ No

Junior College: _____ _____
Program Name of Nearest College with Program

Four-Year College: _____
Name of Nearest College with Program

Apprentice Program: _____
Name and Address of Local Joint Apprentice Committee

MATERIALS HANDLER*

"Hi, Bob."

"Hello, Sam. I haven't seen you since we graduated from high school. It was only a few months ago, but it seems like a long time.

"That diploma got me on the way. It helped me get a job with a new department store that just opened. What are you doing?"

"I have a good job with a construction plant as a materials handler."

"What's a materials handler? I have never heard of that job."

"I didn't know about it either until the personnel manager told me how many openings were available here in Houston. His plant needed six new men to start on-the-job training so I was one of those six.

"What is you work like?

"Well, it'll take a few minutes to tell you. Are you in a hurry?"

"No, go right ahead. I'm interested."

And so . . . Sam told Bob about his job as a materials handler. We won't follow their conversation because Sam told about his specific job at the Houston plant. You're interested in knowing about materials handlers in general. Of course, Sam mentioned many of the following things:

> I have to work inside or outside, or both. I usually walk, stand, bend, or lift. Often I work in noisy places with machine all around me. Sometimes I have an uncluttered, modern, working area.
>
> I have to be in general good health, and pass manual dexterity tests on this job. A materials handler must be able to follow instructions. He should also be careful in handling some materials and, when necessary, should keep records accurately.
>
> I have to load, unload, move, stack, or carry parts and sections of products within the factory or yard. I may use wheelbarrows, handtrucks, elevators, conveyors, electric dollies, trucks, or other equipment to move materials. Sometimes I also count or weigh materials or keep records on materials and supplies.
>
> I get on-the-job training. My average working time is a five-day, 40-hour week with occasional overtime. Pay ranges from $1.25 an hour to over $3.00 per hour.

I hear there are a great number of job openings as materials handlers. In some cases, modern, mechanical methods may eliminate several jobs; however, the outlook is generally good.

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*This story is not original. The author and source are unknown.

What did you learn?

Wage Scale: _____ per hour _____ per hour
State Local

Preparation:

High School Subjects: _____ _____ _____

_____ _____ _____

Private Schools: _____ Yes _____ No

Junior College: _____ _____
Program Name of Nearest College with Program

Four-Year College: _____
Name of Nearest College with Program

Apprentice Program: _____
Name and Address of Local Joint Apprentice Committee

Non-Union Construction Persons

Miss Anna C. Merenda, owner of A. C. Construction Company, 3318 Chapman Street, Houston, Texas, is an attractive woman who fits into the field of construction as well as in a gathering of persons at a tea party. She is involved in mathematics, building materials, and personnel. Although she has a small company which operates only in the Houston area, she provides a big concern in the lives of her employees and in the community. Her employees are covered with Workmen's Compensation and other benefits that are not always available in a small company.

Mr. Harold S. Shockley of Warren Brothers Construction Company, located at 723 North Drennan, Houston, Texas, is another leader in non-union construction. His activities are not limited to the Houston area. Mr. Schockley realized a need for training people to assist with labor activities in the field of construction. He recently applied for and received a government grant to set up a school for unemployed people. They learned about skills needed in the area of labor for construction projects. The school lasted six weeks and ended in immediate employment for those who attended. There was no problem in locating hundreds of people to take the training, but Mr. Schockley found many people still needed more help in attitude, teamwork, and responsibility.

If a person is willing to start at the bottom and work his way up with good skills and teamwork, he will probably advance. He, also, will understand the total building process and his fellow employees. Then he will be able to understand the whole story of construction.

An example of a large construction company that has projects on land and on water many places around the world is Brown and Root. Houston is the location of the central office, and the company is generous in supplying career materials to students and teachers.

Brown and Root has many divisions and with its diversified services is able to answer many of the world's problems. Safety, pollution control, concern for the community, and a thorough, dependable job are stressed in all projects. Brown and Root trains its people in its own instructional programs, so the employees apply training to the situations in their own companies. Brown and Root is a subsidiary of Halliburton. A *subsidiary* is a person or an organization maintained by the funds of others.

Union Training for Construction Careers

(Notes taken from an interview with Mrs. Barbara Bardin, Secretary to Messrs. Jerry Ryan, French Moreland, and Jesse Acosta, Apprentice Opportunity Program, 4520 Weingarten, Houston, Texas, Phone 747-9964.)

In Houston there is an apprentice opportunities program to prepare applicants for the entry tests required in apprentice schools. This tutoring service is given free two nights a week. When a test date is set for a particular construction career, the tutors are hired from Houston Technical Institute. If the students come to class regularly, they will be ready when the test is given; therefore the dropout rate in these classes is very low.

The Apprenticeship Opportunity Program is set up by the Houston Gulf Coast Building and Construction Trade Council. The Manpower Administration, which is part of the Department of Labor, has backed this program for the last five years. The government sets a quota for the ethnic representations in the program. A *quota* is a set proportion which one is entitled to receive from or contribute to in a total sum.

This program is designed to train minority ethnic groups so that they will be ready to take the entry tests required for apprenticeships. When the applicant passes the test, he is ready for indenture. An

indenture is a written contract for an apprentice to serve in a skill service. An *apprentice* is an employee who is being trained in a skill by a master in the trade or craft. The apprentice works on a job to gain skill experience in the daytime and attends classes to learn theory at night. The night classes are usually held twice a week. The total number of years a worker serves as an apprentice depends on the crafts he chooses. He is paid a good salary while he is working as an apprentice. If he is failing in his night courses, he is given warnings before he is dismissed. Salaries are high and workers can be replaced by those waiting to get into construction. After completing an apprenticeship, the worker moves into a higher position as journeyman and then to a master craftsman.

The union acts as a bargaining agent for the workers from the time they are accepted as apprentices through all working and retirement days. A *union* is an association of workers formed for mutual benefit and protection by means of collective bargaining and legislation. Hourly pay, fringe benefits, and safety devices are goals the union works toward. When *management* (owners and their chosen administrators) sits down to bargain with labor's representatives (the union) each side is explaining the terms they want set up for good working and living conditions. These bargaining discussions are called *negotiations.*

When the bargaining is settled, the laborers go on with their work. If an agreement on all terms has not been reached, workers sometime strike. A *strike* is the quitting of work by a body of workers to enforce some demand. No money is earned during a strike, so savings accounts are needed for expenses.

Dues are paid for services the workers receive from their union negotiators. Union organizations, just like business establishments, must operate on money. Everything must be paid for in some way.

PRE-FABRICATED CONSTRUCTION

MODULAR AND PORTABLE BUILDINGS

(Notes taken from interview with Mr. Fred Jersig, Construction Material Salesman)

New methods of building are being tried by some commercial contractors. The objectives of these new methods are to save time and money.

In some places, ready made rooms are being added to existing buildings. These additions are called modules or modular buildings. A *module* is a variable unit of length for expressing the proportions of the parts of a building. The modular building is erected to serve larger numbers, but the additional units are not constructed with concern for the finished appearance. Sometimes the buildings look as if extra large blocks have been added, but they are ready for quick, efficient use.

The prefabricated buildings are becoming very popular for business. The parts of the building are constructed at factories, and these parts are quickly put together at the sites selected for the new buildings.

Sometimes parts of the building—even the roof—are poured of concrete. The molds for the building are brought to the site. One method of giving a finished appearance to concrete is by washing away part of the concrete so that a pebbled surface appears. These buildings are erected quickly, and they are fire proof. Warehouses often select this type of construction.

More and more mobile homes are on the market. Sales have more than doubled recently. The homes are being used not only for vacations and weekend retreats but also for permanent homes in low cost housing areas. A complete mobile home with furniture can be bought for $3000 to $5000. Not only is this home reasonable and efficient but it is also easy to replace if damaged or destroyed.

In planning for a job in construction, it is necessary to know the new and future trends in building. Careers in supplying equipment and selling buildings are as much a part of construction as those involved in skills and crafts.

HOUSTON APPRENTICESHIP INFORMATION CENTER

TEXAS EMPLOYMENT COMMISSION – INDUSTRIAL OFFICE

2613 Austin Street (2nd Floor) P. O. Box 2262

Houston, Texas (713) 224-4211 77001

The Houston Apprenticeship Information Center is a unit of the Texas Employment Commission which is part of the National Employment Service System.

HOUSTON AREA APPRENTICESHIP PROGRAMS
21 November 1972

Program Name, Address Trng., Director, Phone	Age Limits	Education Level Required	Testing Required	Terms (yrs.)	Documents Required
Asbestos Worker 7015 Gulf Frwy. Rm. 123 Jack Comeaux 644-1143	18 - 30	High School grad. or GED cert.	Joint Apprenice-ship Training Committee (JATC) test	4	Diploma or GED cert. transcript, birth cert., two references, DD 214 if veteran
Boiler Maker 1535 West Loop S. Honeywell Bldg. Suite 356 Don McCollum 626-4193	18 - 26 plus vet. allowance	HS grad. or GED	Employment Service (ES) Test	4	Diploma or GED, Birth Cert., medical exam report, DD 214 if vet.
Bricklayer 1500 Louisiana rm. 209 Jack Stubbs 228-5933	17 - 28 plus vet. allowance	HS grad. or GED cert., 11th grade completion acceptable if enrolled in night school	JACT mechan-ical aptitude test	4	DD 214 if vet.
Carpenter 1500 Louisiana rm. 209 George Stein 225-3705	17 - 27 plus vet. allowance	HS grad. pre-ferred. 10th grade completion re-quired	JACT mechan-ical aptitude test	4	DD 214 if vet.
Cement Mason 3130 North Frwy. Don Ford 697-6815	18 - 25 plus vet. allowance	if 18 - 20, HS grad. or GED; if 21 - 25, 9th grade completion required		3	Diploma or GED DD 214 if vet.
Electrician 108 Covern Don G. Tatum 649-2739	18 - 24 plus vet. allowance	HS grad. plus 1 yr. algebra with 76 avg. & 1 of another higher math with 70 avg.	ES aptitude test	4	Transcript, picture, DD 214 if vet.
Floor Layer 1705 Bell rm. 206 Lewis Sechelski 224-0340	18 -25 plus vet. allowance	HS grad. or GED	JATC apt. test and color vision test	4	Diploma or GED drivers license DD 214 if vet.

Program Name, Address Trng., Director, Phone	Age Limits	Education Level Required	Testing Required	Terms (yrs.)	Documents Required
Glazier 226 Tarver E. P. South 697-6691	18 - 25	HS grad. or GED		3	
Iron Worker 7520 Wynlea J. W. Sanders 644-4226	18 - 30	HS grad. or GED	ES apt. test	3	Diploma or GED birth cert., DD 214 if vet.
Lineman Electrician 9430 Telephone Rd. Bill Wilson 644-6218	18 - 25 plus vet. allowance	HS grad. & 2 yrs. math, alg. and above level	ES apt. test	4	Diploma & transcript, birth cert., medical exam, DD 214 if vet.
Lather 2342 Bissonnet J. L. Scoggins 522-6726	16 - 26 and vet. allowance	HS grad. or GED		3	Diploma or GED DD 214 if vet.
Machinist (apply at TEC Apprenticeship Center)	17 yrs. and 9 mos. and up	10th grade completion, 16 wk. pre-apprenticeship training (MDTA)	ES apt. test JATC mech. apt. test and math achievement test	4	Medical exam report, DD 214 if vet.
Millwright 1806 McGowan (1500 Louisiana George Stein 225-3705)	17 - 27 and vet. allowance	HS grad. preferred 10th grade completion required	JATC mech. apt. test and math test	4	DD 214 if vet.
Operating Engineer 1300 Holman rm. 112 Ellis Greene 528-6423	18 - 28	HS grad. or GED	ES apt. test	3	Diploma or GED transcript, birth cert., DD 214 if vet.
Painter 1300 Holman rm. 112 Ralph Milliron 524-5177	18 - 28	11th gr. completion	JATC apt. test	3	Diploma or GED, drivers license, DD 214 if vet
Pipefitter 2507 Galveston Rd. Dave Runnels 629-0201	18 - 25	HS grad. or GED	ES apt test JATC math test	5	Diploma or GED, transcript, birth cert., DD 214 if vet.
Plasterer 2342 Bissonnet Cliff Givens 528-3259	17 - 25	HS grad. or GED		3	HS transcript, DD 214 if vet.
Plumber 1300 Holman rm. 112 Ellis Kitzman 524-5177	16 - 24 plus vet. or college allow.	HS grad. or GED if over age 21	ES apt. test JATC math test	5	Transcript or GED scores, birth cert., DD 214 if vet.

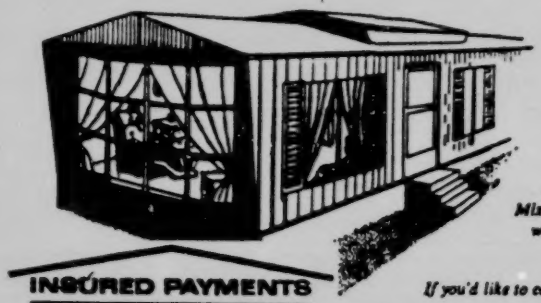
Program Name, Address Contact, Director, Phone	Age Limits	Education Level Required	Testing Required	Terms (yrs)	Documents Required
Roofer 1300 Holman rm. 112 Noah Frazier 528-6423	18 - 30 plus vet. allowance	8th grade functioning level	JATC Achievement test	3	DD 214 if vet.
Sheetmetal Worker 1300 Holman rm. 112 L. Freund 528-6423	17 - 24 plus vet. allowance	HS grad. or GED	JATC apt. test	4	Transcript or GED scores, DD 214 if vet.

APPRENTICESHIP SALARY RANGES (8-72)

Program	Starting Wage	Wage on Completion
Asbestos Worker	$4.07	$7.02
Boilermakers	4.76	6.80
Bricklayer	3.60	7.20
Carpenter	4.01	6.66
Cement Mason	4.06	6.25
Floorlayer	3.13	6.25
Electrician	3.83	7.65
Glazier	3.71½	6.75½
Ironworker	4.60	6.57½
Lineman, Electrical	5.12	7.31
Lathers	3.45	7.05
Millwright	4.15	6.92
Operating Engineers	3.99	6.65
Painter and Decorators	3.52½	6.18½
Plasterers	3.50	6.82½
Pipefitter	4.03	7.32½
Plumbers	3.49½	6.99
Sheetmetal	3.66	7.32
Roofers	3.86	5.93

Cut out this recipe for

INSTANT HOME . . .



Ingredients

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Desirable location
Immaculate prepossessed single and double wide mobile homes
Immediate availability

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PLUMBING REPAIR: Sewers and sinks cleaned. Reasonable! Good service! HOYT PLUMBING, 864-3120

NEW CONTRACTS, specializing in apartments; also, REPAIR & REMODELING, 692-4050.

LAMAS' COMPLETE PLUMBING SERVICE. Repairs, new install sewer lines cleaned. Free Esti. 692-5091.

PLUMBING & REPAIR JOBS & WATER HEATERS. LICENSED 697-0042

FITZ's complete plumbing repairs. Electric sinks & sewer service. Copper water repiping. 631-3216

R. C. PLUMBING COMPANY
Contracting & Repair 8 to 5 wk. days, all day Sat. 649-4857

YOUR BEST BET
HIRE A VET
PHONE 225-1711

1ST CLASS COMBINATION

BOILERMAKERS

SHIPFITTERS

WELDERS

$4.30 to $4.75 as qualified.

ALSO NEEDED

LEADERMEN

AND

2ND CLASS SHIP FITTERS

PAID VACATION, HOSPITALIZATION, MAJOR MEDICAL AND LIFE INSURANCE.

BLUDWORTH SHIPYARD, INC.

Brady Island, foot of Cypress Street

an equal opportunity employer M/F

193,900 New Houses Built In September

Washington (UPI) — An estimated 193,900 new housing units were completed in the United States in September, an increase of 5 percent over August and 14 percent over September last year, a government survey showed today.

The Commerce and Housing and Urban Development Departments said there were 1,641,100 privately-owned housing units under construction at the end of September. This was slightly above the total at the end of August and 28 percent more than at the end of September last year.

Construction Loan Officer
$20,000+

Your expertise in construction lending will open the door to [illegible] with this billion dollar company's con[illegible]

CARPENTER SUB CONTRACTORS

Working carpenter with 1 or 2 crew. Able to do Remodeling type work, including trim.

STEADY WORK
524-2991

BRICK CONTRACTOR
Contractor with crew for residential Sub-division. Call between 4:30 & 5. 697-2751 ext. 371.

Houston Chronicle
Nov. 11, 12, 13, 1972

Assistant to sales staff.

LOCAL HOME BUILDER

IN SOUTHEAST HOUSTON AREA

IS SEEKING AN ASSISTANT FOR IT'S SALES STAFF.

Person selected will act as secretary-receptionist for the sales office, assist with general office work deal with customers & process applications.

OPPORTUNITY TO LEARN HOME SALES.

Position requires a 44 hour work week with varied hours, includes some weekends. Min. of 2 years college or Equivalent in experience.

SEND COMPLETE RESUME IN CONFIDENCE TO

CHRONICLE BOX 6749

PIPING DRAFTING

TRAINING PROGRAM

Earn salary while learning Design Drafting in piping through Fluor's training program. Continued employment & outstanding advancement opportunities upon completion of program.

APPLICANTS MUST HAVE

- 4 full semesters of college, or equivalent in pre-engineering or drafting technology.
- 4 drafting courses
- Semester high school or college trigonometry
- or the equivalent of the above

If you wish a career in Piping Design call or write immediately, Frances Patterson,

FLUOR

ENGINEERS & CONSTRUCTORS, INC.

4620 North Braeswood Blvd. 77035

668-9241 ext. 360

Equal opportunity employer

FOREIGN CONSTRUCTION

ALL TRADES

ALL CRAFTS

OVERSEAS JOBS

9055 Katy Freeway, Suite 112

461-3425

CONCRETE FINISHERS

and

SLIP FORM PAVER OPERATOR

to work in Houston area. Top wages. Long hours with guarantee. Report to Field office at the location of 610 & Jensen. Phone 694-4302.

Texas Bituithic Co.

An Equal Opportunity Employer

PLUMBER

Lead men. Experienced in commercial and industrial. Steady work. Paid vacation, paid hospitalization.

Stanley J. Briers Co.

6109 ST. AUGUSTINE

747-0505

BRICKLAYERS

CONTRACTORS ONLY

SUPERIOR HOMES 441-2341

TRIM CARPENTER

AND CABINET MAN

Must be good. Call 771-9221

CONSTRUCTION SUPERINTENDENT

For apartment and motel projects. Able to travel and relocate periodically. Experienced and willing to accept new computer systems.

Contact Mr. H. O. BAKER 667-5641

PREDICTIONS FOR CONTRACT CONSTRUCTION

In 1968, the Construction industry in Texas employed 294,500 workers. Between 1968 and 1975, some 49,700 jobs will be added to the industry. Construction activity is expected to be stimulated by an increasing population and the formation of countless new households, higher levels of personal and corporate income, and a continued movement of population to the suburbs. Government expenditures for highways and other facilities, the building of new airports and the enlargement and modernization of existing ones, and continued industrial expansion throughout the state will boost heavy construction expenditures.

Construction employment, however, will not rise in proportion to dollar volume of expenditures. More efficient materials-handling equipment, prefabricated building components, new and improved construction materials, and other technological innovations will tend to limit employment growth. Despite these factors, however, there will still be a 17 percent increase in construction employment between 1968 and 1975. Such an increase would compare favorably with that experienced during the 1960-1968 period when a 21 percent gain in construction jobs in Texas was recorded.

Heavy-construction contractors will experience the most rapid increase in manpower requirements during the first half of the decade. The federal long-range highway development program will be an important factor in stimulating employment in the "heavy" segment. Special-trades contractors will experience a moderately rapid increase in job levels, as the construction of new residences and the renovation and remodeling of homes that are already occupied will continue at a relatively fast pace. The installation of more and more convenience gadgets in homes will add to the number of new workers needed by carpenters and cabinet-makers and by plumbing, painting, and electrical contractors.[1]

Upswing seen for construction in gas industry

Dramatic increases in natural gas utility and pipeline construction expenditures are forecast over the next four years, the American Gas Association reports.

Corresponding increases are projected in requirements for debt and equity financing for the gas industry.

The figures, up sharply from previously announced projections, are based both on reports of transmission and distribution companies to AGA, and on Federal Power Commission forecasts based on information received by the FPC from gas industry firms.

Construction expenditures for the full year 1971 totaled $2,419 million, broken down as follows: $340 million for production and storage facilities, $842 million for transmission, $171 million for underground storage, $858 million in distribution, and $178 million for general construction expenditures.

For 1972, forecases show total construction reaching $2,963 million, with $733 million for production and storage, $867 million for transmission, $230 million for underground storage, $969 million for distribution, and $164 million for general construction costs. The 1972 forecast represents the largest gain in construction expenditures seen through 1975.

Houston Post
October 15, 1972

[1] *Texas Employment Outlook to 1975 by Industry and Occupation* by Texas Employment Commission, July, 1971.

WOMEN IN CONSTRUCTION

A large national organization, Women in Construction, has volunteered their services in classroom on a regular schedule. These dedicated employees in the construction field want to share their time and talent with Occupational Orientation students.

W. I. C. will explain and demonstrate the interrelationship of many career fields in construction. They also hope to encourage more women to become involved in construction activities.

In Houston, Miss Nancy House is the current (1972) W. I. C. president. She is making long range plans for increased activities in career education. You may contact her at the Embe Company, Ph. 785-5000. Another person who will be eager to help is Mrs. Leslie McGuire at 666-3687 in Houston.

Other cities throughout the nation also have active member in W. I. C. They will probably be glad to help career classes.

Apprenticeship Schools
Charlie Farley
522-9845

Method of getting into apprenticeship training, teaching procedures, and job opportunities will be learned. Make reservations at least two weeks in advance.

Building Construction Trades
2704 Sutherland
Houston, Texas 77023
926-4433

Job sites open at the time tour is desired. Can be discussed with Mr. M. A. (Pee Wee) Graham. Plan with him several weeks before the tour.

Building Materials

TEXAS INDUSTRIES, INC.—Houston Division
Philip H. Harris
6400 West Park Drive
Houston, Texas 77027
785-3330

Description: Building materials.
Specifications: Welcome U. S. and foreign groups; also student groups (no one under 18); Maximum 20; need one month advance notice; company supplies safety attire; tours narrated; special lectures available on rrequest; some information restricted both to U. S. and foreign visitors; prefer touring during morning hours.
Tour classification: By arrangement only.

CONSTRUCTION RESOURCE ASSISTANCE

Speakers

Mr. William D. Pickens 869-4315
Business Manager Plumbers Local Union No. 68
P. O. Box 8746, Houston, Texas 77009

Mr. Charles Gribble, Jr. 622-8044
Building Specialists
P. O. Box 22812, Houston, Texas 77027

Mr. Dick Gallaway 224-6241
Counsellor for Apprenticeships
Texas Employment Commission, 2613 Austin
P. O. Box 1390 , Houston, Texas 77001

Mr. Ray S. Knox 666-4014
Rayco Construction Company
Construction of service stations
5612 S. Rice
(Invited teachers and students to tour plant)

Mr. George Hederhorst 666-0682
Landscape Architect — Southern Landscaping Company
6503 Mapleridge
(Speaker and tours provided)

Mr. Dick Lewis 224-6051
Contractor—Associates

Miss Anna C. Merenda 228-2106
Owner of A. C. Construction Co.
3318 Chapman, Houston, Texas 77009

Mr. Jack Moore 453-7261
Occupational Skills
Todd Ship Yards
Industrial Road

Mr. Terry Thompson . . . . . .672-4671—ext. 3141
Brown and Root
4100 Clinton, Houston, Texas

Mr. J. B. Webster 225-0421
Kirby Lumber Company
401 Louisiana, Houston, Texas

Mr. Don Horn 923-9473
Sec.-Treas. of AFL-CIO
6333 Gulf Freeway, Room 201
Houston, Texas 77023

Mr. Joe Goddard 686-5926
IAM Coordinator Apprenticeship and Training
7207 Housman St., Houston 77055

Mr. Jack Stubbs, ...228-5933
Director, Bricklayers, Apprenticeship
1500 Louisiana, Rm. 112, Houston, Texas 77002

Mr. Dave Runnells 649-0201
Coordinator, Pipefitters Apprenticeship
P. O. Box 5026, Houston, Texas 77017

Mr. Jack A. Comeaux 644-1143
Director, Asbestos Workers Apprenticeship
7015 Gulf Freeway, Rm. 126, Houston, Texas 77009

Mr. Don Ford 697-2779
Director, Cement Masons, Apprenticeship
3130 North Fwy., Houston, Texas 77009

Mr. Jules Freund 528-6423
Sheet Metal Workers, Apprenticeship
1300 Holman, Houston, Texas 77004

Mr. Vance C. Fridye 224-0340
Bus. Mgr. Floor Layers, Apprenticeship
1705 Bell, Houston, Texas 77003

Mr. Clifford Givens 528-3259
Bus. Mgr. Plasterers Apprenticeship
2342 Bissonnet, Houston, Texas 77005

Mr. Ellis Greene 528-3259
Operating Engineers, Apprenticeship
1300 Holman, Rm. 114, Houston, Texas 77004

Mr. Ellis Kitzman 524-5177
Director, Plumbers, Apprenticeship
1300 Holman, Houston, Texas 77004

Mr. Don McCollum 227-8669
Coordinator, Boilermakers, Apprenticeship
956 M & M Bldg., Houston, Texas 77002

Mr. J. W. Sanders 644-3206
Director, Iron Workers, Apprenticeship
7520 Wynlea, Houston, Texas 77017

Mr. J. L. Scroggins 522-6726
Bus. Mgr., Metal Lathers, Apprenticeship
2342 Bissonnet, Houston, Texas 77005

Mr. George Stein 225-3705
Director, Carpenters, Apprenticeship
1500 Louisiana, Rm. 112, Houston, Texas 77002

Bibliography

By Mrs. Mary Belt—Fondren Jr. High

E=Excellent
G=Good

Evaluation	*Pamphlets*	*Source*
G	"Should You Go into Agricultural Engineering"	Career Information Service, New York Life Insurance Co.
E	"Agricultural Engineering"	
E	"The Opportunities and Challenges for Furture Agricultural Engineers"	
E	"Ag. Engineering as a Part of the Engineering Profession"	
E	"Did You Wish You Could Change the World?"	
E	"Your Career as an Aerospace Engineer"	
E	"Building Inspector"	Texas View
G	"Will You Be a Chemical Engineer"	Am. Institute of Chem. Engineers, 345 E. 47th Street, New York, N.Y. 10017
E	"Is Civil Engineering for You?"	(Same as above)
E	"Chemical Engineering"	(Same as above)
E	"Top Hand in the Building Trades"	United Brotherhood of Carpenters and Joiners of America, 101 Constitution Ave., N. W., Washington, D. c. 20001
E	"Carpenters"	(Same as above)
E	"Hands to Build America"	(Same as above)
G	"Should You Go Into the Construction Business?"	Career Information Service N. Y. Life INsurance Co. (Same as above)
G	"Should You Be a Draftsman?"	(Same as above)
G	"Should You Be an Electronic Engineer"	(Same as above)
E	"Local Apprenticeship and Training Standards of the Electrical Contracting Industry"	Inst. of Electrical and Electronics Eng., Inc. 345 E. 47th St. New York 10017

CONSTRUCTION
Media

	FILM	*NUMBER*	*TIME*
1.	*Engineering—The Challenge of the Future* Pilot Productions	L-5322	21 min.
2.	*Opportunities in Welding* Sterling Educational Film	5313	7 min.
3.	*The Rise of Labor* Encyclopedia Britanaica Edu. Corp.	L-5210	30 min.
4.	*We Use Power* Churchill Films	5303	11 min.
5.	*Drafting Methods* Tools that are needed and principles of drafting	M-4497	13 min.
6.	*Jobs in Sheet Metal Trades* Sterling Educational Films	5310	10 min.

Slide Tape Presentation

1. *Hands to Build America* (in O. O. office)
(Material from Homebuilders Association)

Records

1. Arthur Godfrey Talks about the Plumbing Industry
(From past to present to future) Long playing record
(in O. O. office)

Filmstrips

Evaluation	*Title*	*Source*
E	"Careers in Materials: Engineering, The Aerospace Age"	Guidance Associates Pleasantville, N. Y. 10570
E	"An Overview of Technical Ed."	(Same as above)

E	"Your Challenge in Electrical Eng."	Inst. of Electrical and Electronics Eng., Inc. 345 E. 47th St. New York 10017
E		
E	"Electrical Inspector"	Texas View
E	"Engineering—A Challenge"	Engineers' Council for Prof. Development 345 E. 47th Street New York, New. York 10017
E	"Can I Be an Engineer?"	GM Public Relations Staff, Detroit, Michigan
G	"After High School, What? Engineering or Engineering Technology?	Engineers' Council for Prof. Development
E	"Engineering and Science Technicians"	O. O. Handbook Reprint Supt. of Documents, Washington, D. C.
G	"Should You Be an Engineer?"	Career Information Service New York Life Insurance Company
E	"Your Future in Plumbing, Heating and Cooling"	Nat'l. Association of Plumbing, Heating, Cooling Contractors, 1016 20th N. W., Washington, D. C. 20036
E	"Rod and Chainman"	Texas View
E	"Electricity and Electronics"	Oregon Cluster Guide
E	"Career Briefs"	Desk-Top Career Brief
E	"Jobs in Engineering"	SRA Job Family Series Booklet
E	"Jobs in Building Construction Trades"	(Same as above)
E	"Jobs in Technical Work"	(Same as above)

Books Available in Library

(Same general books as on the other clusters)	
"Careers and Opportunities in Engineering"	Philip Pollack Dutton, 1967
"Careers in Engineering"	Theodore Wachs N. W., Walck, 1964

CAREER INFORMATION FOR YOUR FIELDS OF INTEREST

Get recent books and magazines from public or school library.
Go to see the State Employment Offices.
Send for government bulletins and information from schools and business leaders.
Visit places of work.
Join clubs. Find hobbies and crafts that tie in with your interests.
Know your Social Security Number and Laws of U. S. Department of Labor.
Make your own visual aids.
See films on careers.
Clip newspaper articles and want ads.
Practice writing letters of application. Keep your resume up to date.
Interview friends, relatives, neighbors, civic, and business leaders.
Attend classes in careers and related subjects.
Keep up with changes in the working world.
Do volunteer work.

SECTION E

MANUFACTURING OCCUPATIONS

SECTION E
MANUFACTURING OCCUPATIONS

I. Behavioral Objectives

A. Seventy-five percent of the students will list three or more manufacturing opportunities that are now available. They will also name two or more future opportunities that have been predicted.

B. Eighty percent of students will explain how their lives would change if manufacturing machinery disappeared completely.

C. Seventy percent of students will write or draw team units needed to manufacture a completed product.

II. Instructional Procedures

A. Individual needs and abilities must be considered as individual assignments are made.

B. Since manufacturing machinery is often hazardous, many plant managers advise against study tours for the entire class. Tours on an individual basis may be acceptable for some students in well-chosen plants if arrangements are made in advance.

C. The following list of activities should be duplicated and distributed to students on the day the manufacturing unit is introduced.

STUDENT ACTIVITIES

Each student will complete two or more of the following activities.

1. Make a small scale mechanical model of an assembly line operation. Be creative! Be realistic in your choice of materials.

2. Add pictures to the notes which you took on the first day of the manufacturing unit.

3. Give a three-minute oral story of the work involved in designing, building, and running some kind of machine in a manufacturing company.

4. Pretend you are stranded on an island that has no manufacturers. There is no way of transporting anything to you. All kinds of raw materials are on the island. Describe what you would be able to manufacture and how.

5. Write a three-page research paper on the story of a product which is manufactured, such as the story of tires, oil, sewing machines.

6. Demonstrate the use of a tool needed in a manufacturing plant. Explain the purpose of this tool.

7. Draw a series of cartoons that show workers converting raw materials into manufactured goods.

8. Draw a schematic and explain the drawing to the class.

9. Pretend you are an industrial designer working on a product design problem. You are to design the manufacturing process for a product for boys between the ages of 12 and 16. National sales forecasters say a million dollar sales market will begin next summer if your product is ready.

10. Write a two-page biography of a manufacturer; for example, Henry Ford.

11. Plan a mini-debate, allowing each speaker two minutes. Use the topic Automation vs. Individualism. You and your instructor will decide on the resolution.

12. List the most needed gauges and quality control devices on a production line. You may decide on the product being made.

13. Write a job description sheet for manufacturing a product.

14. Orally identify at least two pre-processing practices and two processing practices.

15. Name three or more pieces of equipment needed for safety in some manufacturing situations.

16. Clip three or more want ads for help in manufacturing. Paste them in your scrapbook.

17. List five rules of safety when working with machinery.

18. Draw a chart that shows the organizational structure of a manufacturing corporation.

19. Management has approved a list of items to be purchased. Take part in bidding and purchasing activities between a purchasing department and several vendors. The equipment to be bought is 5 drill presses, 15" floor model with no accessories; 3 combination belt and disc sanders, 6" belt and 10" disc; 2 spray painting outfits without air compressors; 25 gallons of clear finish spray lacquer.

20. List five products manufactured in Houston. (Use the yellow pages of the telephone directory.)

21. Tape or write an interview with an employee in manufacturing. Use the interview guide provided in the introductory appendix of the curriculum guide.

22. Make a poster of manufacturing careers.

23. Write a thank-you letter to the guest speaker from the manufacturing field.

24. Complete an outline of team work needed to manufacture a simple product. (Example of outline is found in the appendix.)

25. List all steps needed in manufacturing a product of your choice. (An outline is in the appendix.)

26. Draw an organizational chart for your manufacturing company. (A pattern is in the appendix.)

III. Performance Goals

A. Involvement in teamwork for completion of a finished product

B. Filling society's needs with people's skills

C. Awareness of safety percautions that can carry over in all activities

D. Diagrams or models of plans or procedures in manufacturing.

E. Oral and written concepts on advantages and disadvantages of automation.

IV. Evaluation

A. Participation in group activities

B. Completion of individual assignments

C. Summation of all work that is done on manufacturing unit. Check wheel of career information.

FLEXIBLE LESSON PLANS

First Day—Introduction

Show slide or films. (See appendix.)
Discuss visual aid and student's knowledge of manufacturing.
Hand out list of student activities. Make assignments.

Second Day—Guest Speaker (list in appendix)

Third Day—Current Happenings

Newspaper and magazine articles
Assistance with preparation of student activities assigned on first day of unit

Fourth Day—Students' Presentations

Individual and group activities which were assigned on the first day
Group guidance in an improvisational skit regarding a manufacturing problem (if time permits).
Example:

A new young worker on the assembly line is fast and efficient but very sarcastic to the older workers. Teamwork of the older workers is good but slow. Now teamwork is gone. Everyone is angry. You are the foreman.

APPENDIX

1. Interdependence Chart
2. H.E.W. Chart
3. Stories, Data, Activities*
4. Want Ads
5. Predictions
6. Resources
   a. Study tours
   b. Speakers
   c. Media
   d. Printed Materials
7. Summation Wheel

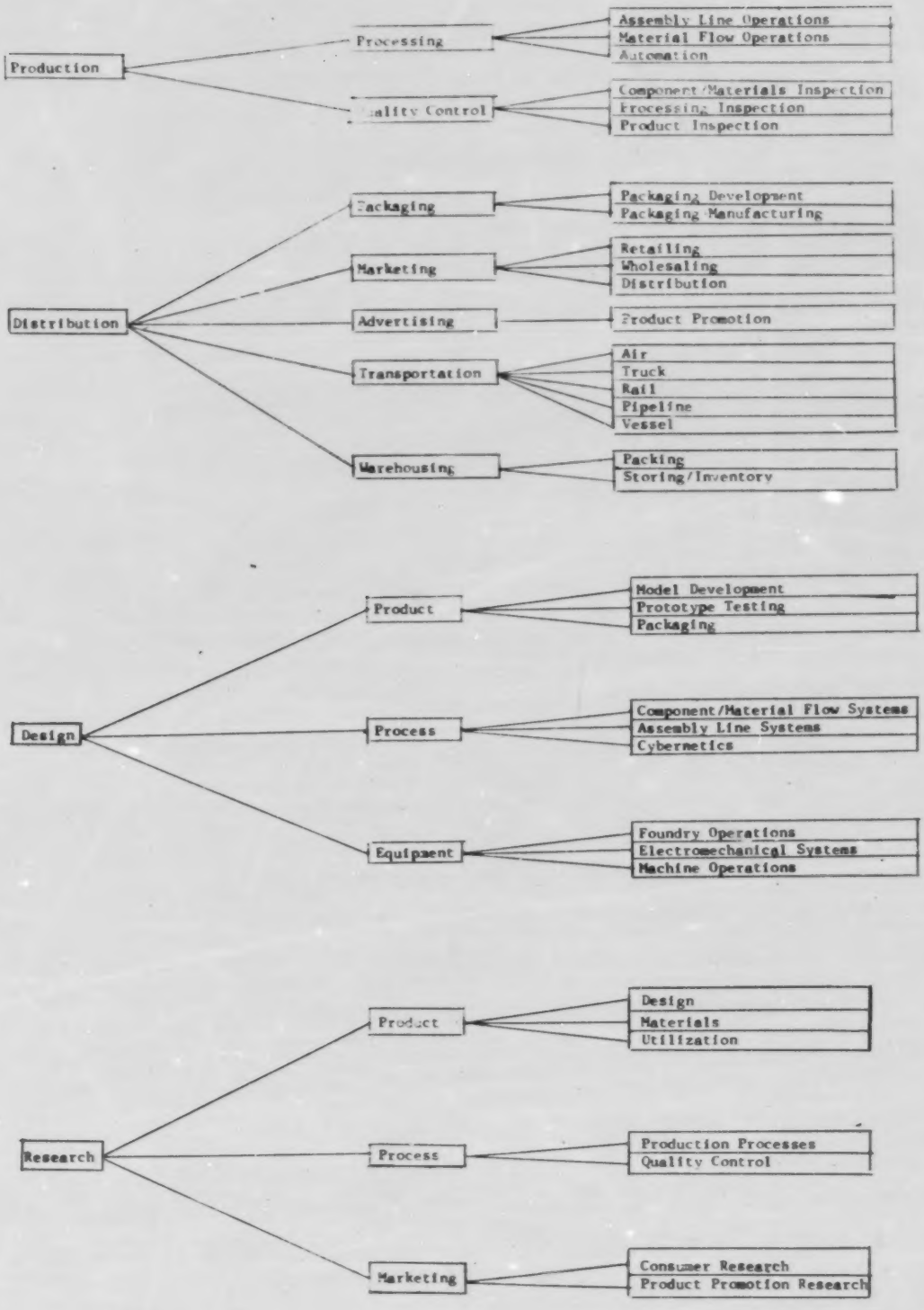
---

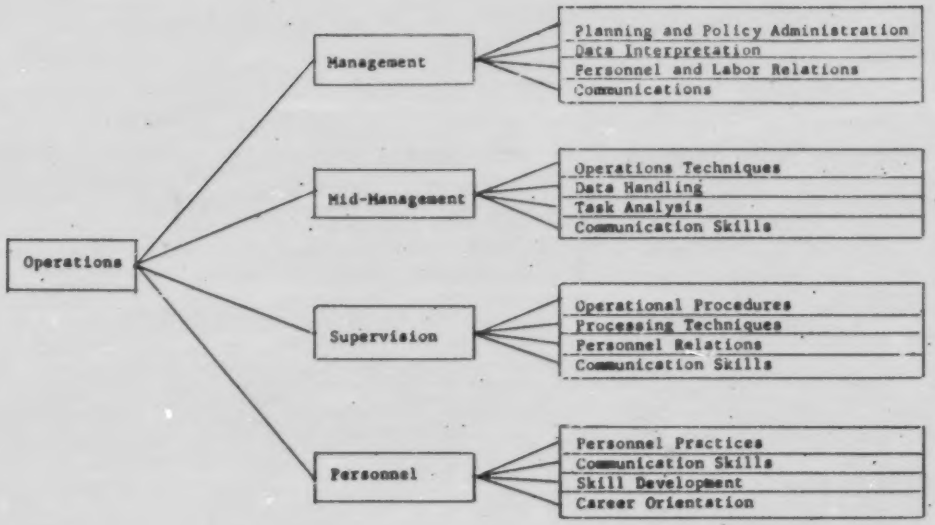
*This may vary with specific subjects in the different careers

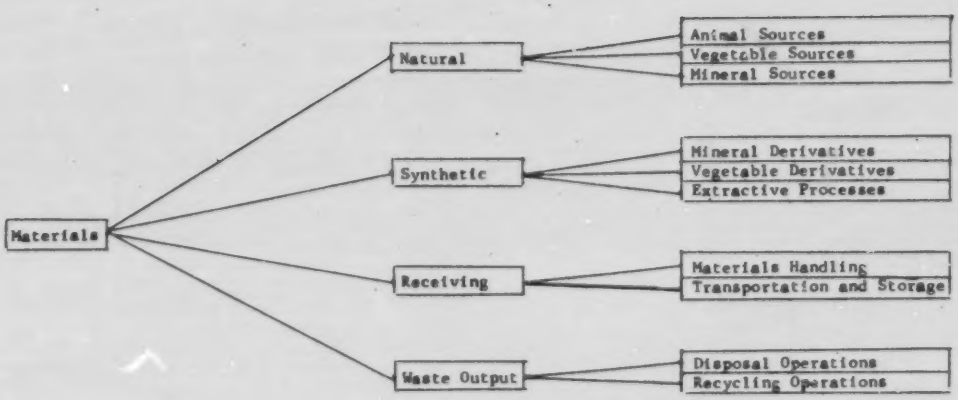
MANUFACTURING—Interdependence—Examples of a Few People and Places

Needs	Careers	Places of Employment
Durable Goods	Electrical engineers	Steel plant
Why?	Craftsmen	Plastic applicators
Primary metal	Assembly line workers	Oil field equipment
Fabricated metal	Personnel directors	Pump factory
Machinery	Labor arbitrators	Pipe factory
Transportation	Public relations directors	Fence company
	Technical writers	Bolt and screw factory
Nondurable Goods	Inspectors	Tin can plant
Why?	Office managers	Aluminum can plant
Food and kindred products	Salesmen	Coffee plant
Paper and allied products	Plant managers	Industrial chemical plant
Chemical and allied products	Purchasing agents	Electronic supplies
Petroleum products	Truck drivers	Refinery
	Fork lift operators	
	Mechanics	
	Safety Engineers	

CLUSTER FOR MANFACTURING




Operations
Management
Planning and Policy Administration
Data Interpretation
Personnel and Labor Relations
Communications
Mid-Management
Operations Techniques
Data Handling
Task Analysis
Communication Skills
Supervision
Operational Procedures
Processing Techniques
Personnel Relations
Communication Skills
Personnel
Personnel Practices
Communication Skills
Skill Development
Career Orientation


Materials
Natural
Animal Sources
Vegetable Sources
Mineral Sources
Synthetic
Mineral Derivatives
Vegetable Derivatives
Extractive Processes
Receiving
Materials Handling
Transportation and Storage
Waste Output
Disposal Operations
Recycling Operations

CLASSIFICATION OF MANUFACTURED GOODS

Manufacturers divide their products into two main categories—hard (durable) goods and soft (non durable) goods.

Hard, durable goods are those products that usually last three years or longer. Manufacturers have established a classification of products for ease in computation of supply and demand. Examples of durable goods are lumber, clay, furniture, and transportation equipment.

Soft, non-durable goods, on the other hand,are those products which usually last fewer than three years. A look at these articles makes it easy to identify products that have a quick turn-over in consumer sales. The profit margin of soft goods is not so great as that of hard goods. Examples of soft, non-durable goods are paper, clothes, and light weight metal or plastic containers.

In trying to plan future needs on a local, national, and international level, it is necessary to know whether the product is classified as hard (durable) or soft (non-durable). It is also necessary to know trends that are predicted for future use. Watch newspapers and magazines for new products that are coming on the market and old products that are declining in popularity. Plan your future with the growing needs of products.

Highly Sophisticated Color Camera Unveiled

Miami Beach, Fla. (AP)—After four years and $250 million, the Polaroid Corp. today introduced a new self-developing, color camera.

About the size of a paperback book and weighing only 24 ounces, the SX-70 will retail for $180 and be available shortly after the first of next year, Polaroid said. It will go on sale in Florida Nov. 10.

The camera, brainchild of Polaroid founder Dr. Edwin Land, requires the photographer essentially to do only three things—focus, push the shutter button and wait.

One second after the photographer pushes the shutter, the camera ejects a developing picture unit within an invisible, stiff protective plastic structure. The unit represents 17 layers of compounds, some only 10-thousandths of an inch thick.

The picture area at first appears uniformly turquoise, but within six minutes becomes a brilliantly colored finished print immune to rain, sun and fingerprints. It is almost impossible to bend or break with a human hand.

There are no waste products—no picture coaters, no paper to discard, no mess.

The camera can be focused from 10 inches to infinity. Operation is controlled by 250 transistors contained in the film packs. The packs cost $6.90 for 10 exposures. A special flash for indoor pictures was developed for the camera by General Electric. They cost $2.77 for a package of 10.

New products often mean new jobs will become available. Write a research paper on new products that may be manufactured in the next ten years.

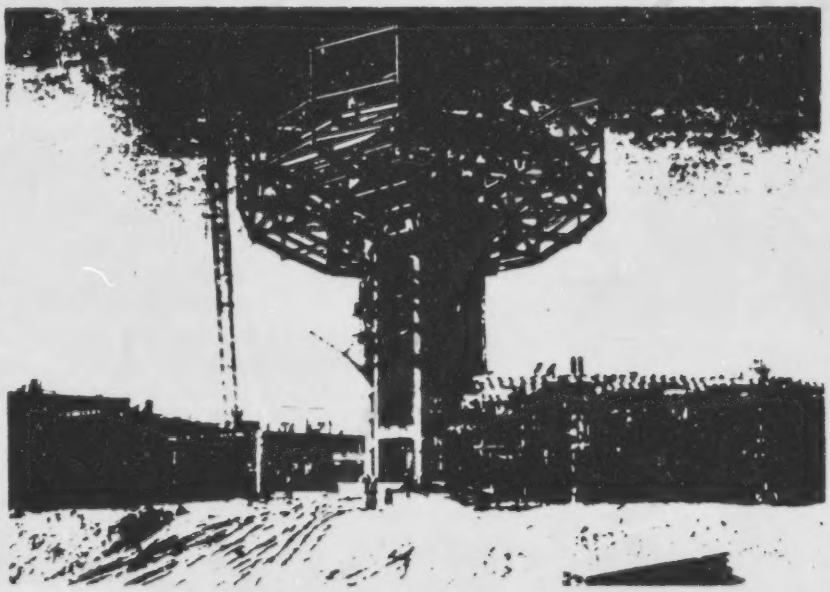
HOUSTON CHRONICLE October 27, 1972

MANUFACTURING

Newsweek
October 23
1972

GM assembly line: A tough new division in a bitter fight

Houston Chronicle
November 5
1972



Congratulations

STRUCTURAL STEEL BY

GENERAL STEEL COMPANY

GENERAL STEEL COMPANY

1. Get more information on the above stories.
2. Watch papers and magazines for more stories on new manufacturing plants and methods.

SAFETY CAREERS

Every occupational field includes an emphasis on safety, but precautions in manufacturing extend into all jobs involving the factory's products. This means safety inspectors will have many career opportunities in protecting not only lives of the men and women in the factory but also the lives of all those who use the products being manufactured.

Inspectors should *investigate* (study carefully) ways to prevent accidents as well as causes of all accidents. Teaching workers to use safe methods before accidents occur is a function of safety employees. Providing the very best safety equipment available is still another job for safety workers. Safety equipment includes: hard hats, goggles, face shields, gloves, lights, safety shoes, fire extinguishers, vents for chemicals, showers, and many more devices.

Many universities now include a number of courses in safety management and engineering. Many union representatives also point out safety needs because they represent men on the jobs. Often unions can speak for safety needs when first noticed by individual workers in the plant.

The city, state, and federal governments have joined forces with owners of factories, union leaders, and government officials in a fight for safety. Everyone realizes that a life lost or destroyed affects the entire country.

Often a simple object, such as jewelry or a neck tie, can catch in a fast moving piece of equipment, and all or a major part of the body is pulled into the machine. The dangerous situations that bring on death or basket cases can be prevented through safety employees who educate, inspect, enforce, and report on all dangers.

A TYPICAL OUTLINE TO SHOW TEAMWORK FROM RAW MATERIALS TO FINISHED PRODUCT TO RECYCLING PLANT

Paper

Stage 1—Prepare Raw Products
(from a tree to small chips at lumber mill)

a. List the pre-processes

_____
_____

b. List the processes

_____
_____

Stage 2—Make Materials
(from chips of wood to pulp sheets at pulp mill)

a. List the pre-processes

_____
_____

b. List the processes

_____
_____

Stage 3—Make Components
(from pulp sheets to a roll of paper at paper mill)

a. List the pre-processes

_____
_____

b. List the processes

_____
_____

Stage 4–Combine Components
(from roll of paper to a local daily paper in pressroom)

a. List the pre-processes

_____
_____

b. List the processes

_____
_____

Stage 5–Prepare Papers for delivery
(from pressroom to home)

What work occurred?

_____
_____
_____
_____
_____

Stage 6–Collect Old Newspapers
(from home to paper factory)

a. List pre-processes

_____
_____

b. List processess

_____
_____

NOTE:
This outline may be used in other manufacturing procedures for products of your choice.

DO YOUR OWN
MANUFACTURING OF A SIMPLE PRODUCT
(Frozen Ice Treat, Plastic Toys, Bicycle Accessory)

Suggested Outline for Planning

Need of Goods (Be specific)

_____
_____
_____
_____
_____

Procedure for Production
(Steps may be added as needed)

1.
2.
3.
4.

Employees Required
(List job titles, duties, and number of people)

_____
_____
_____
_____
_____ _____

Equipment

_____
_____
_____
_____
_____

Supplies

_____
_____
_____
_____
_____

Safety Rules

_____
_____
_____
_____
_____

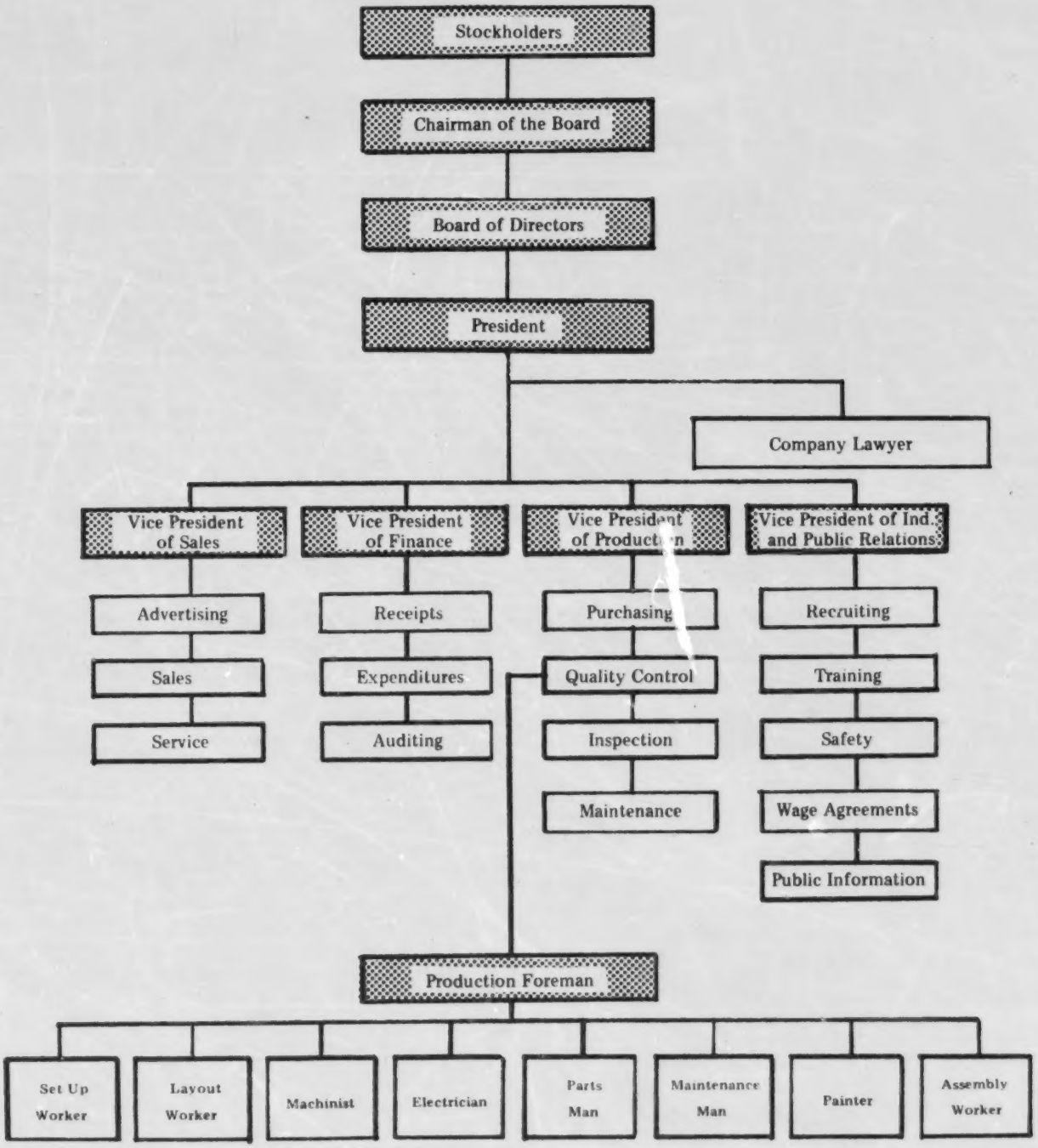
Inspection guide

_____
_____
_____
_____
_____

EXAMPLE OF AN ORGANIZATIONAL PATTERN

Rank, salary, and responsibilities are heaviest at the top of the page and in shaded boxes gradually they decrease on the way down the page; however, no organization can be strong when people at any level feel weak or left out. "A chain is no stronger than its weakest link" is an old quotation that applies in every job and in every career field.

Order of importance in salary and authority may vary from one plant to another.



The Rubber Industry Never 'Tires' Of Battling: Radial Fight Is Next

BY WILLIAM D. SMITH
© 1972 New York Times News Service

New York — The rubber industry at the moment appears to agree on only one thing: The radial tire is the tire of the future.

How soon that future is upon us is the multibillion-dollar question around which tire makers have decided to wage what may be the greatest marketing battle in their rough-and-tumble competitive history.

Each of the major and minor rubber companies has staked out a position on how soon radial tires will capture a major chunk of the American market. They are planning large capital investments to support their educated guesses about the future.

State of Flux

The marketing battle over radials coincides with a period in history when the American consumer is being told more about the tires on his car than ever before — and probably understands less. The old black rubber doughnut of a few sizes has been replaced by a a wide array of styles, shapes, designs and materials. The variety of tire offerings has created a marketing manager's dream (or nightmare) and has left many customers lost in a maze of engineering and advertising jargon.

Claude H. Allard, president of the Uniroyal Tire Co., a division of Uniroyal, Inc., commented: "There is no question that the industry is in a great state of flux and the customer is caught in it. The advent of the radial and the great number of alternatives are the chief influences."

Bounced Back

Radial tires are not new. They were developed during the late 1940s by Michelin of France and were ignored. During the 1960s, however, they swept Europe, fostered by Michelin and the Italian company, Pirelli.

Radials now make up about 65 percent of the European tire market. By contrast, they hold only 6 to 8 percent of the American market, with foreign companies supplying half the total.

There are three basic types of tires: Bias ply, radial ply and bias belted.

For many years tire manufacturers have used layers of rubber-coated fabric to form the body or carcass of their tires. The textile cords of the fabric in these layers, or plies, were placed at an angle of about 35 degrees from the car's line of travel. The direction of this bias was alternated with each ply to provide stability in steering and resistance to punctures.

During the 1960s the tire makers reduced the number of plies from four to two while doubling the size of the cord to retain the over-all fabric strength. Customers, however, didn't want any part of these so-called two-ply tires. One of the major marketing disasters of the tire industry's history resulted.

During this period, American tire researchers were busily developing new cord materials such as polyester, glass and finely drawn steel. At the same time they were keenly aware of the success of radial tires in Europe.

Radial Advantages

In radial construction the cord in the fabric runs across the tire at 90 degrees to the line of travel. Next to these plies, under the tread, is placed a belt of two or more layers of fabric running only a few degrees off the line of travel. The belt makes for easier rolling, provides more puncture resistance and in creases tread wear by reducing friction and tread squirm.

Radial tires run only about half as hot as traditional tires. And there is considerably less tread squirm, allowing longer tire life. In addition, radials hold the road better because a greater part of the tread is in contact with the road at any one time. This permits faster stops and even increases gas mileage.

Despite all these advantages, however, a switch to mass production of radials was out of the question for some good reasons. Suspension and steering systems on American-built cars were not engineered to radial tires. To comfort conscious Americans, the radials meant louder, harder riding at slow to moderate speeds. Also, radials could not be produced on standard tiremaking equipment and were thus costly.

Bias Belted Tire

The dilemma was resolved in 1967 when Goodyear Tire and Rubber Co., the largest in the industry, combined feature of bias ply and radial ply to produce the bias belted tire. In this version a belt, similar to the radial tire's belt, runs over the old bias plies. The bias belted tires provided many of the advantages of radials without many of their problems.

Goodyear mounted an aggressive marketing campaign to convince auto makers of the advantage of bias belted tires, and the other major tire companies soon followed suit.

Success is the proof of the tire. This year bias belted tires, built with fiber-glass, textile or steel cord, account for about 85 percent of the 49 million-unit original equipment market for car tires and 37 percent of the 140 million-unit replacement market.

Both radial and bias belted tires, however, are still trying to catch up with the old standard bias ply models. These account for more than 50 percent of over-all tire volume, with the great bulk of sales coming in the replacement market.

Industry experts expect all three tire styles to carry on into the 1980s. What share of the market they capture will depend on the success or failure of their corporate proponents' marketing strategy and, of course, on the decisions made by the auto makers on original equipment tires.

Tuesday, September 5, 1972
★★
HOUSTON CHRONICLE
Section 1, Page 9

What predictions are made about tire manufacturing by 1980?

Now! MOTALOY gives your car's rings and valves a replating job while you drive!
SEE HOW ONLY $6 WORTH OF MOTALOY RECONDITIONS YOUR ENGINE— HELPS PREVENT THE NEED FOR A $100 RING AND VALVE JOB!
HERE'S HOW MOTALOY WORKS!
Here's all you do and you do it only once! Just drop 4 Motaloy Tabs into your gas tank and this single treatment does all this . . .
WINNER OF THE GOLD MEDAL OF THE INTERNATIONAL INVENTORS FAIR
SAVES FUEL HERE
RESTORES LOST POWER AND COMPRESSION HERE
FILLS SCORED CYLINDER WALLS HERE
IMPROVES VALVE ACTION HERE
STOPS PISTON SLAP HERE
STOPS OIL LEAKING PAST RINGS HERE

New inventions change the needs for certain jobs. Can you list jobs that are declining because of new inventions? Replacements sometimes are less expensive than repairs. This also changes the job picture for repairmen.

"Sometimes failure brings success."

Explain how this manufacturing story brings out the above quotation.

Auto Emission Device Offered

GM Challenged by Man Who Invented Potty-Tune

BY DAN FISHER

©1972, Los Angeles Times-Washington Post News Service

Orange, Cal. — Caleb (Bud) Swanson has faced tough challenges before.

A few years ago he devised and tried to sell a bathroom training chair that rewarded a cooperative youngster with a few bars of "How Much Is That Doggy in the Window?"

At $14.95, however, his Potty-Tune didn't sell too well in competition with less expensive, albeit silent, versions.

Now the 41-year-old president of tiny Air Quality Products Inc. here is about to take on General Motors Corp. and give the world's largest manufacturing concern a 67 percent price advantage to boot.

The battlefield is the huge California market (estimates range from $50 million to $200 million for used car emission control devices. In all, an estimated 2.5 million California cars will be affected.

Air Quality Products and GM are the only two firms whose devices have been certified by California's Air Resources Board. Swanson's firm has a transistorized ignition system and regulates electronically a car's vacuum spark advance.

The vacuum spark advance controls the point during the stroke of a car's piston at which the spark plug fires. Variations affect such things as power, fuel economy, and emissions.

The rig reduces hydrocarbon emissions by an average of 65 percent, carbon monoxide by 45 percent, and oxides of nitrogen by 50 percent, according to figures it supplied ARB. It will list for $50, including installation.

The GM device disconnects a car's spark advance except when coolant temperature rises above a certain limit. It will cost about $20 installed, and reduces hydrocarbons by 40 percent, carbon monoxide by 20 percent, and nitrogen oxides by 35 percent, according to GM tests.

Despite his price disadvantage and the fact that Swanson's financial resources probably wouldn't pay for the coffee spilled inside the GM building every year, he says he's confident his product will account for "at least" 20 percent of the market.

If Swanson is on the right side of a major controversy over the GM device, he might wind up with an even larger share.

He charges that the GM approach will result in extensive valve damage to many cars, necessitating repairs that would cost affected owners about $150.

Disconnecting a car's spark advance — which both devices do under certain operating conditions — helps lower emissions, but it can lead to overheating.

That's why GM's device includes a system that will make the spark advance operate when coolant temperatures exceed a preset level.

Nonetheless, Swanson argues, exhaust gases can become hot enough at freeway driving speeds to ruin valves — even if the coolant itself is within safe temperature limits.

The Air Quality Products device electronically phases the spark advance back into operation at speeds above 40 miles per hour, protecting valves he adds.

GM acknowledges that its control approach will raise exhaust gas temperatures, but denies it will cause valve problems on pre-1966 cars. However, GM did say recently it would not offer a similar device for 1966 through 1970 autos — which already operate at higher temperatures than earlier models — because of concern over valve damage.

ARB officially contradicts Swanson.

It had to find that the GM device had no significant adverse effects before it could legally accredit the system. One ARB official admits privately, however, that "I'm a little worried" about valve problems, and that ARB is checking GM's system further.

HOUSTON CHRONICLE
May 31, 1972

Reverse Investments Explained

Houston Called Prime Area For Luring Foreign Industry

Houston and its diversified industrial complex is a prime area for industrial expansion from Europe and Japan, says the chairman of the Texas Industrial Commission.

Chester Wine, who recently returned from an overseas seminar on the subject, discussed the national reverse investments program at the quarterly meeting of the TIC at the Houston Oaks Hotel today.

Reverse investments, a unique program sponsored by the U.S. Department of Commerce, encourages foreign manufacturers to enter into a joint agreement with American firms for plant expansions or new facilities.

Trouble in Bloc

"Many firms in Western bloc countries are faced with labor shortages, rising production costs and transportation problems," said Wine. "They are seeking new production sites and markets for their products in the United States.

"Texas' 13 deep-water ports, central location, and other industrial assets are most attractive to these firms," he added. "Houston, with its port and large chemical and petro-chemical complexes, has the facilities many of these firms seek."

During the reverse investments conference in Germany, Sweden and France, Wine said there was a positive response to Texas' investment opportunity presentations.

"We secured four substantial prospects, 10 significant leads and numerous requests for additional information," he said.

200 Seekers

Wine said that more than 200 foreign industrialists attended conference sessions many of them seeking new markets while others were interested in exports, joint ventures, mergers, acquisitions and branch locations.

Wine said that there now are more than 40 foreign owned firms operating in Texas.

A special report was presented to the commission by Dante Siracuse of Bowen Tools, Inc., on the recent Moscow-Bucharest trade mission which netted Texas manufacturers more than $45 million in sales for the coming year.

HOUSTON CHRONICLE
July 27, 1972

MANUFACTURING ENGINEER

MECHANICAL ENGINEER

6 to 12 years experience in the design and installation of machinery used in the manufacture of fabricated equipment. Salary commensurate with experience. Small growing U.E.M. supplying the Petro-Chemical Industry. Houston area location.

An equal opportunity employer
Send resume in confidence to:
CHRONICLE BOX 1384

Petroleum Equipment Manufacturer

HAS POSITION FOR:

ESTIMATORS AND JOB COST ANALYSTS

RAPIDLY GROWING WELL established manufacturer of oilfield separating, treating and metering equipment selling internationally needs estimators to do cost estimating and job cost analysts to do cost analysis on pressure vessels, piping and controls. Both positions require experience in Pressure vessel and piping cost estimating. Married, good working conditions. Salary open and based on experience. Chance for advancement based on ability and productiveness. All replies confidential. Send complete and current resume of training and experience.

Metrol Corporation

P. O. Box 18277 Houston, Texas 77018
PHONE AREA CODE 713—692-5976

PETROLEUM DRILLING & PRODUCTION EQUIPMENT

Significant opportunities with a $20 million Houston-based oil tool manufacturing and marketing division of a technically-oriented NYSE company.

MARKETING MANAGER

To create a professionally comprehensive marketing function required by the dynamically changing oil tool industry. Requires relevant experience in market research, analysis, and penetration; product design, development, pricing, and management; service; and the administrative direction of an aggressive, proficient, and motivated sales function.

MANUFACTURING MANAGER

To revitalize the total manufacturing/production capabilities and efforts of the division. Requires extensive experience in manufacturing technology, production control and scheduling, industrial engineering, inventory management, and accounting control systems utilization. "Turnaround" experience would be an asset. Degreed engineer preferred.

Respond in confidence, with personal information, including current compensation, to:

Chronicle Box 113Q

An equal opportunity employer with a positive affirmative action program.

MANUFACTURING OFFICE CLERK

Large manufacturing firm is in need of real sharp individual with supervisory experience. Also some experience in manufacturing Cost Accounting, inventory control & scheduling. Salary open. Good company benefits. Apply in person. 9714 Old Katy Rd.

Factory Trainees

Raise each month $3.28 per hr.
FAST PLACEMENT
Professional Personnel Service
12333 DULUTH 452-6383

ENGINEERS

Manufacturing Quality Control

Union Carbide Corporation, a major producer of electronic components, is seeking engineers for Manufacturing and Quality Control for an expanding facility on the border, near Brownsville, Texas.

Experience in Manufacturing, Quality Control or Electronics is desirable but not essential.

Send detailed resume to:
R. H. Boysen

UNION CARBIDE CORP.

Materials Systems Division

P. O. Box 3126 Brownsville, Texas 78520

An Equal Opportunity Employer M/F

WANTED

EXPERIENCED SEWING MACHINE OPERATORS

Cloth Spreaders, Bundlers and Pressers—Silk Finishers. Steady work, no lay-offs, top wages, major medical, hospitalization, life insurance, paid holidays, paid vacation, free parking.

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JOE FRANK, INC.

MISSION MANUFACTURING CO.

A SUBSIDIARY OF *TRW INC.*

EXPERIENCED

FOUNDRY WORKERS

4 day week. 2nd shift

$2.87-$4.07 Hr.

CONTACT PERSONNEL
462-3461
an equal opportunity employer

M. DAVID LOWE'S

ENGINEERING DIVISION

PERSONNEL SERVICE

MECHANICAL ENGINEERS —EVERYTHING'S COMING UP ROSES. Here are just a few of the many Mechanical Engineering positions that our client companies have listed with us.

FABRICATING ENGINEER. The person hired for this position will be groomed for future plant manager. Calls for experience in steel building or related industry. ..... Starting Salary $14,000

TURBINE ENGINEER. An expanding staff has created an opening for a Mechanical Engineer well versed in the application of rotating equipment as applied to the gas processing industry ..... Starting Salary to $20,000

COMPRESSOR SPECIALIST. A new division has been formed to lease air compression equipment to the oil patch in the Gulf Coast area. Potential earnings will exceed $25,000 ..... Base Salary to $15,000+

MANUFACTURING ENGINEER. An established company has entered the market to manufacture large valves for refineries and related industries. Fabrication problems have arisen that need to be solved. This position is in new product development ..... Starting salary to $18,000

MAINTENANCE ENGINEER. A practical mechanical engineer who is not afraid to get their hands dirty and who can go into the shop and keep the materials handling equipment running should look into this ..... Salary area: $15,000

For more information on these and other positions, call Mark Krause or George Pitzer at 461-7777.

TOWN and COUNTRY
10555 KATY FREEWAY
TOWN & COUNTRY
OFFICE PARK, SUITE 101
461-7777

PERMANENT EMPLOYMENT AT

DRILCO

IN THE FOLLOWING CLASSIFICATIONS

- **MANUFACTURING TRAINEES**
- **MACHINE PARTS INSPECTOR TRAINEE**

Must have quality assurance experience or drafting experience.

Growing company with good advancement, excellent profit-sharing plan, group hospitalization company paid, 7 holidays, 2-week vacation, merit raises and good salaries.

Apply in person

DRILCO

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An Equal Opportunity Employer

Cameron

IS NOW HIRING MACHINE OPERATORS FOR THE FLOOWING JOB CLASSIFICATIONS:

TURRET LATHE
ENGINE LATHE
VERTICAL BORING MILL

STARTING RATES TO 4.71 PER HOUR
SHIFT DIFFERENTIALS OF 16c and 22c PER HR.

JOB BIDDING SYSTEM OFFERS UNUSUAL OPPORTUNITY TO GAIN DIVERSIFIED MACHINE SHOP EXPERIENCE AND ADVANCEMENT. EXCELLENT WORKING CONDITIONS WITH LIBERAL FRINGE BENEFIT PROGRAM INCLUDING:

FULLY PAID RETIREMENT
PAID VACATIONS (4 WEEKS MAX.)
PAID SICK LEAVE
FULLY PAID HOSPITALIZATION INSURANCE
CONTRIBUTORY LIFE AND LONG TERM DISABILITY INSURANCE
9 PAID HOLIDAYS ANNUALLY

APPLICANTS MUST BE ABLE TO MAKE OWN SET UPS AND HAVE HAND TOOLS APPLY IN PERSON OR CALL EMPLOYMENT OFFICE

CAMERON IRON WORKS, INC.

KATY ROAD AT SILBER **683-2613**

AN EQUAL OPPORTUNITY EMPLOYER

PREDICTIONS

Manufacturing is a strong basis for the Nation's economic strength. The skilled work force provides the important workers for industrial processes. Skilled workers make the patterns, models, tools, dies, machines, and equipment for all career fields. "Employment in skilled occupations grew from about 8.6 million workers in 1960 to 10.2 million in 1970. Continued growth is expected in the years ahead.[1]

"About 9 million semi-skilled workers were employed in manufacturing in 1970. The broad field of semi-skilled jobs will provide many employment opportunities for young persons in the years ahead.[2] Examples of semi-skilled workers are assemblers, machine operators, and material movers. Food processing companies, clothing and automobile manufactures are examples of companies that use many semi-skilled workers.

"Many supervisors and administrators in manufacturing plants have come from the ranks of craftsmen. A *craftsman* is one who practices a certain trade needed in an industry or business. An example of a craftsman is a welder. Factory owners and money backers of manufacturing firms recognize the value of *executives* (company leaders) who have both manufacturing know-how of the crafts and the ability to oversee and guide people. In manufacturing, the college graduates, as well as the trade school graduates, will have many opportunities to become administrators if they have hands-on experience in crafts and an understanding of managing people and money."

---

[1] "*Skilled and Other Manual Occupations,*" an excerpt from the *1972-73 Occupational Outlook Handbook*, U.S. Department of Labor, Washington D.C.
[2] *Ibid.*

MANUFACTURING STUDY TOURS

Bakeries

MRS. BAIRD'S BAKING CO.
Mrs. Peggy Johnson
1925 West Gray
Houston, Texas 77019
522-5111

Description: Bakery
Specifications: Welcome tourists, foreign vistors, student and adult groups; minimum 3; maximum 100.
Tour classification: Regular tour by appointment on Fridays, 11 a.m.—3:30 p.m.

RAINBO BAKING CO.
Jane Parr
4104 Leeland
Houston, Texas 77023
227-2241

Description: Bakery
Specifications: Welcome tourists, foreign visitors, student and adult groups; Minimum for groups 9; Maximum 80; need one month advance notice; tours narrated.
Tour classification: Regular tours for tourists, by appointment, Wednesdays after 12:30 p. m. until 4:30 p.m. Group tours by special advance arrangement.

Battery Manufacturing

TEXFORD BATTERY COMPANY
Charles G. McCarthy
2002 Milby
Houston, Texas 77003
222-0126

Description: Manufacture lead-acid, industrial batteries (only such manufacturing in Texas).
Specifications: Welcome foreign vistors, student and adult groups; Minimum 2; Maximum 8; need 3 days advance notice; tours narrated; special lectures available on request; prefer touring between 9 a.m. and 3 p.m.
Tour classification: Groups only by advance arrangement.

Bookbinding

A. V. EMMOTT & SONS BOOKBINDERS, INC.
A. V. Emmott, Sr.
1101 Hamilton
Houston, Texas 77003
224-6221

Description: Bookbinding, binder manufacturing and printers finishing.
Specifications: Welcome U. S. and foreign visitors including students; Minimum 1; Maximum 12; need 1 day advance notice; tours narrated; translating service available in Spanish and German; prefer touring 8 a.m.-4:45 p.m., M—F.
Tour classification: By arrangement only.

Bottlers

THE HOUSTON COCA–COLA BOTTLING CO.
Diane Melengzer
2800 Bissonnet
Houston, Texas 77001
664-3451, ext. 209

Description: Bottle Coca-Cola.
Specifications: Welcome U. S. and foreign groups; also student groups; Minimum 6; Maximum 60; need 2 weeks advance notice; some areas of plant are restricted to all visitors; tours narrated; special lectures available on request; tours must be arranged between hours of 10-10:30 a. m. and 1:30-2:30 p.m.
Tour classification: By arrangement only.

Container Manufacturing

CENTURY PACKAGING–Division of Century Papers, Inc.
7430 Ardmore
Contact Mr. I. S. Heyman
P.O. Box 14007
Houston, Texas 77021
748-7400

Description: Manufacture folding cartons.
Specifications: Welcome student groups high school age and above; Welcome U.S. and foreign groups; Minimum 8; Maximum 10; need 2 weeks advance notice; No Smoking in plant and no soft-soled shoes such as sandals or tennis; tours narrated; special discussions available on request; translating service available in Spanish; prefer touring between 9 and 11 a.m.; tour duration 40 minutes.
Tour classification: By arrangement only.

AMERICAN CAN COMPANY
C. M. Harper
Employe Relations
Lockwood and Clinton Drive
Houston, Texas
672-2421

Description: Metal & fiber containers manufacturing.
Specifications: Welcome student groups high school age and above; Welcome U. S. and foreign groups; no photographing permitted by any visitor; Minimum 10; Maximum 30; need one week advance notice; tours narrated; special discussions on plant operation is regular procedure, certain information restricted to all visitors, prefer touring 10 a.m.-3:00 p.m. M-F, tour duration 1 ½ hours
Tour classification: By arrangement only.

Food Products

LA POBLANA FOOD PRODUCTS
Johnny Torres
7648 Canal St.
Houston, Texas 77012
921-4760

Description: Produce tortillas, tamales and Mexican style sausage.
Specifications: Welcome students (no age limit); Welcome U.S. and foreign groups; No minimum; Maximum 30; need 3 weeks advance notice; tours narrated, translating service available in Spanish; prefer touring in the afternoon; tour duration one hour
Tour classification: By arrangement only.

FRITO-LAY, INC.
Hugh Brown
6601 Stillwell
Houston, Texas 77017
645-6625

Description: Snack food manufacturers.
Specifications: Welcome U.S., student and adult, groups; no technical, professional or foreign visitors, no minimum; Maximum 20; need 4 days advance notice; tours narrated; special discussion available on request; certain information restricted; prefer touring 2-4 p.m., tour duration 30 minutes average.
Tour classification: By arrangement only.

Foundries

DEE FOUNDRIES, INC.
2408 Everett St.
Contact. R. A. Colton or
M. Myers
P. O. Box 8727
Houston, Texas 77009
222-6271

Description: Large nonferrous jobbing foundry pouring brass, bronze and aluminium sand castings.
Specifications: Welcome student groups (technical only); Welcome U.S. and foreign groups (technical or professional only); No minimum; Maximum 10; need one week advance notice; tours restricted to males, tours narrated, special discussions available on request but limited to small groups and informal discussions, prefer touring 9:30-11:30 a.m. and 1-2:30 p.m.
Tour classification: By arrangement only.

Hat Manufacturing

AMERICAN HAT COMPANY, INC.
Sandy J. Truxillo
4510 Feagan Street
Houston, Texas 77007
869-0331

Description: Manufactures Western Straw and Felt Hats.
Specifications: Welcome tourists, students, U.S. and foreign groups; Minimum 5; Maximum 12 (more on special request); need one week advance notice; tours narrated; special discussions available on request. Certain information restricted to all visitors; translating available in Spanish and German.
Tour classification: By arrangement only.

Glass Manufacturing
Plate-Window-Stained-Leaded

BINSWANGER GLASS COMPANY
Buck Walters
207 North Main
Houston, Texas 77002
225-1161

Description: Glass, Mirrors—glazing
Specifications: Welcome U.S. and foreign adult groups; Minimum 6, Maximum 12; need 4 days advance notice; tours narrated, special discussions available on request; prefer touring 1:30 to 3:30 p.m.
Tour Classification: by arrangement only.

Steel Mills

HOUSTON WORKS—ARMCO STEEL CORP.
Industrial Road
Contact: David G. Haines
P. O. Box 1367
Houston, Texas 77001
453-7211, ext. 573

Description: Steelmaking, shaping and treating.
Specifications: Welcome students (11th grade or above), U.S. and foreign groups (technical or professional only); Minimum5; Maximum 200; need 2 weeks advance notice if U.S. citizens and 4 weeks for foreign nationals; hard hats and safety glasses furnished; females should wear slacks and low heel shoes; no in-plant photography permitted; some plant areas restricted to all visitors; tours narrated; special discussions available on request.
Tour classification: By arrangement only. Mr. Haines says students age 12 and older will be accepted from O. O. classes.

Sugar Refineries

IMPERIAL SUGAR COMPANY
198 Kempner St.
Sugar Land, Texas 77478
Contact: Robert Rosenbaum
P.O. Box 9
Sugar Land, Texas 77478
494-1981, ext. 317

Description: Cane sugar refinery
Specifications: Welcome tourists, students, U.S. and foreign groups; No minimum; Maximum 100; need one week advance notice for groups; tours rarrated; special discussions available on request; translating service available in Spanish; tour duration one hour.
Tour classification: Regular tours 10 a.m. and 2 p.m. Monday-Friday. Other by advance arrangements only. Guide on duty to handle up to 20 visitors at one time. For larger groups and for times other than regular tours, need advance notice.

Iron Works

REPUBLIC MANUFACTURING COMPANY
Mae Shaver
5901 North Freeway
Houston, Texas 77022
694-9598

Description: Ornamental iron works.
Specifications: Welcome tourists, students (high school age and above), U.S. and foreign groups; No minimum; Maximum 15; No advance notice required; some plant areas restricted to all visitors; tours narrated; certain information restricted to all visitors; translating service available in Spanish; prefer touring 8 a.m. to 5 p.m.
Tour classification: Open house

Rubber Manufacturing

GOODYEAR TIRE & RUBBER COMPANY—Houston
Chemical Plant
LaPorte freeway and Highway 225
Fred L. VanOsdall, Personnel Manager
P.O. Box 5397
Houston, Texas 77012
926-8811, ext. 221

Description: Manufacturers of synthetic rubber.
Specifications: Welcome students (age 12 and older), U. S. and foreign groups; No foreign technical or professional visitors; Minimum 10; Maximum 50; need 10 days advance notice; ladies wear low heels; some plant areas and information restricted to all visitors; tours narrated; special discussions available on request; prefer touring 9 a.m. to 3 p.m.
Tour classification: By arrangement only.

MANUFACTURING RESOURCES

Speakers

Mr. George D. Houser 691-2241
6411 Airline
Electric Sign Manufacturer—Houser Neon Sign Co.
(Teachers and students invited to tour plant)

Mr. Carl Menger 692-7241
Insulated Cable—Triangle Conduit and Cable Co., Inc.
(Speaker; free printed materials; teacher and students may tour plant)

Mr. J. H. Zeh 748-1100
Chemical Manufacturing—Stauffer Chemical Co.
(Speaker; also arrange tours for teachers)

Mr. John W. Woolridge . . . . . .928-5371 ext. 220
Communications Eq pt, Mfg. Western Electric Co.
(Arrange tours; free printed materials; loan film and filmstrips)

Mr. W. C. Burton, Jr. 644-2409
Assns. of Manufacturing—National Association
(Speaker, free materials, loan of film and filmstrips)

Mr. David Johnson 227-3314
Binder Mfgr. Johnson Cover Company
2616 Polk or P. O. Box 331, Houston, Texas 77001
(arrange tour for teachers)

Mr. Howard L. Fikes . . . . . .926-3121 ext. 465
Mfg. Oil Tools
G. W. Murphy Industries
6501 Navigation, Houston, Texas

Mr. Michael O'Shea 869-3531
Manager, (Personnel)
Tube Turns (Welding Machine Shop)
7100 Katy Freeway, Houston, Texas

Mr. C. J. Phillips . . . . . .781-3261 ext. 232
Western Geophysical
8100 Westpark

Mr. David Haines 453-7211
Armco Steel Corporation
P.O. Box 96120, Houston, Texas 77015
(Speakers and free loan of 30 minute colored film, "Steel Production")

Mr. Jim McLaurin 224-3629
Crutcher Resource Corporation
P.O. Box 3227, Houston, Texas 77001
(Manufacture heavy pipe line equipment)

MANUFACTURING
Media

FILM	*NUMBER*	*TIME*
The Industrial City Encyclopedia Britannica	M-5213	16 min.
The Industrial Worker Encyclopedia Britannica	M-5214	17 min.
Jobs in Sheet Metal Trades Sterling Educational Films	5310	10 min.
Man and the Second Industrial Revolution McGraw-Hill	L-5438	19 min.
Milling Machine DCA Educational Products	5349	7½ min.
Fahrenheit 3300 Scenes of high temperature industrial processes and the role of the refractory in the conservation of mineral ores U.S. Dept. of Interiors	L-4712	28 min.
Cloth: Fiber to Fabric Describes manufacturing process of synthetics	M-4445	15 min.
Drafting—Drawing and Planning for Metal Work Shows types of work, drawings and patterns	M-4496	
Forge and Ornamental Iron Demonstrations of work are given	M-4506	13 min.
Furniture and Craftsmen Work of designers, joiners, carvers, upholsterers and finishers	4457	13 min.
Power Train Animation explaining why, what, and how of automobile transmission system	M-4645	13 min.
So You Want to be a Tool and Die or Mold Maker? Requirements for apprentice, training, education and opportunities given. Role on the job	3821	13 min.
The Hothead A welder loses his temper	4749	8 min.

Metal Flies Working in metal	M-4776	13 min.
Soldering (Equipment and work for tinning on iron)	M-5105	13 min.
Sugar—Pure Cane Sugar (Refining, harvesting and transporting)	M-5153	8 min.
Why People Have Special Jobs The Man Who Makes Spinning Tops (Introduces concept of specialized labor)	4950	10 min.
Technicians in Our Changing World	3147	
**Steel Production* Colored film free loan from Armco Steel Corp. Call Mr. David Haines, 453-7211		30 min.

*Goodyear films—Call Mr. Robert Rowley, 225-1305, for booklet of titles.

Filmstrips

*"An Overview of Technical Education" Parts I and II	Guidance Associates of Pleasantville, New York, 10570

Transparencies

Made from master copies furnished by 3M Company located in all major cities.

**The Story of Steel*—20 Tr.

**The Story of Rubber*—14 Tr.

Films from Modern Talking Picture Service

The 200 Million — 30 min. color. An exciting story that shows how all American lives are touched through the manufacture of many diversified products.

Why the Shoe Fits — 28 min. color. A dramatic story of how shoes are made from the time the design is created until the shoe reaches the store.

This Is Valvo — 12 min. color. A tour of the modern automobile manufacturer in Sweden.

The Paper Forest — 28½ min. color. Shows the giant machines used in the billion-dollar-a-year paper industry.

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*Not available in AV center at Houston Independent School District.

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Lux, Donald G. and Willis E. Ray. *The World of Manufacturing.* Bloomington, Ill.: McKnight and McKnight Publishing Company, 1971. (Copyright by the Ohio State University Research Foundation, Columbus, Ohio 43210.)

_____ . Laboratory Manual for *The World of Work.* Bloomington, Ill.: McKnight and McKnight Publishing Company, 1971.

_____ . Teacher's Guide for *The World of Manufacturing.* Bloomington, Ill.: McKnight and McKnight Publishing Company, 1971.

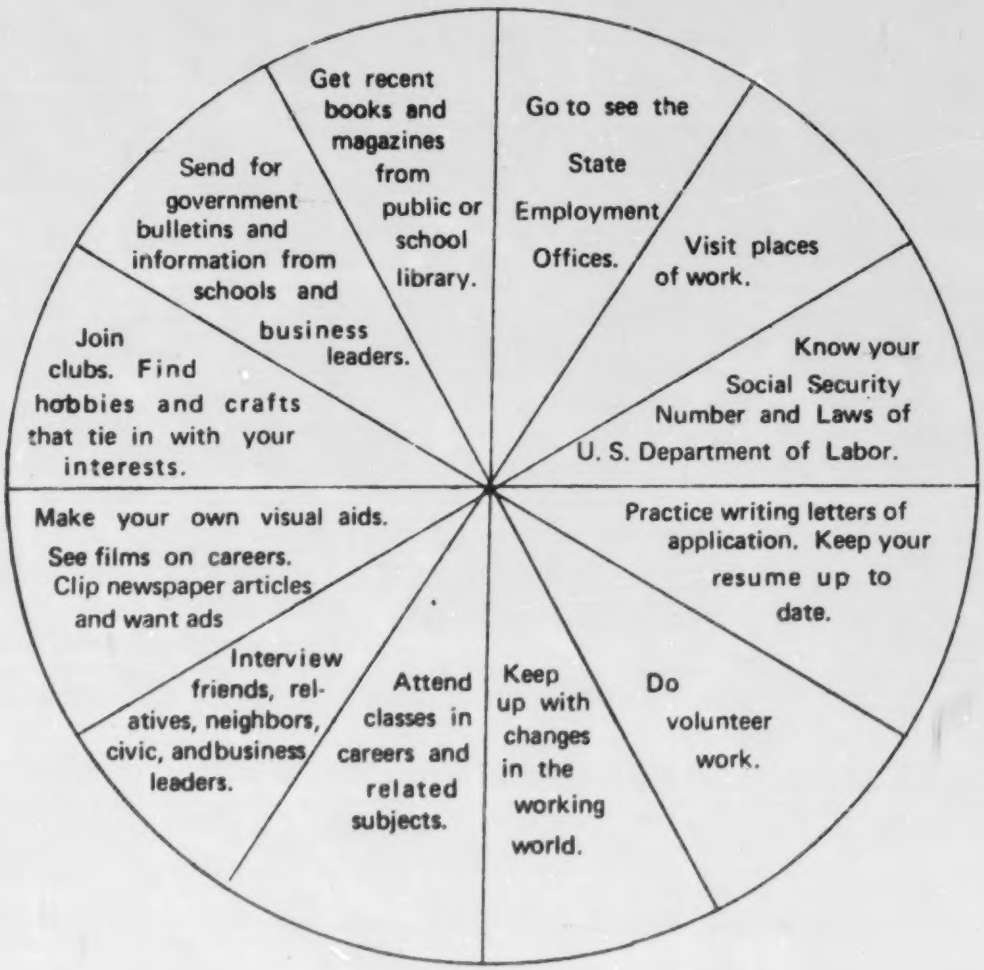
Pamphlets

By Mrs. Mary Belt — Fondren Jr. High

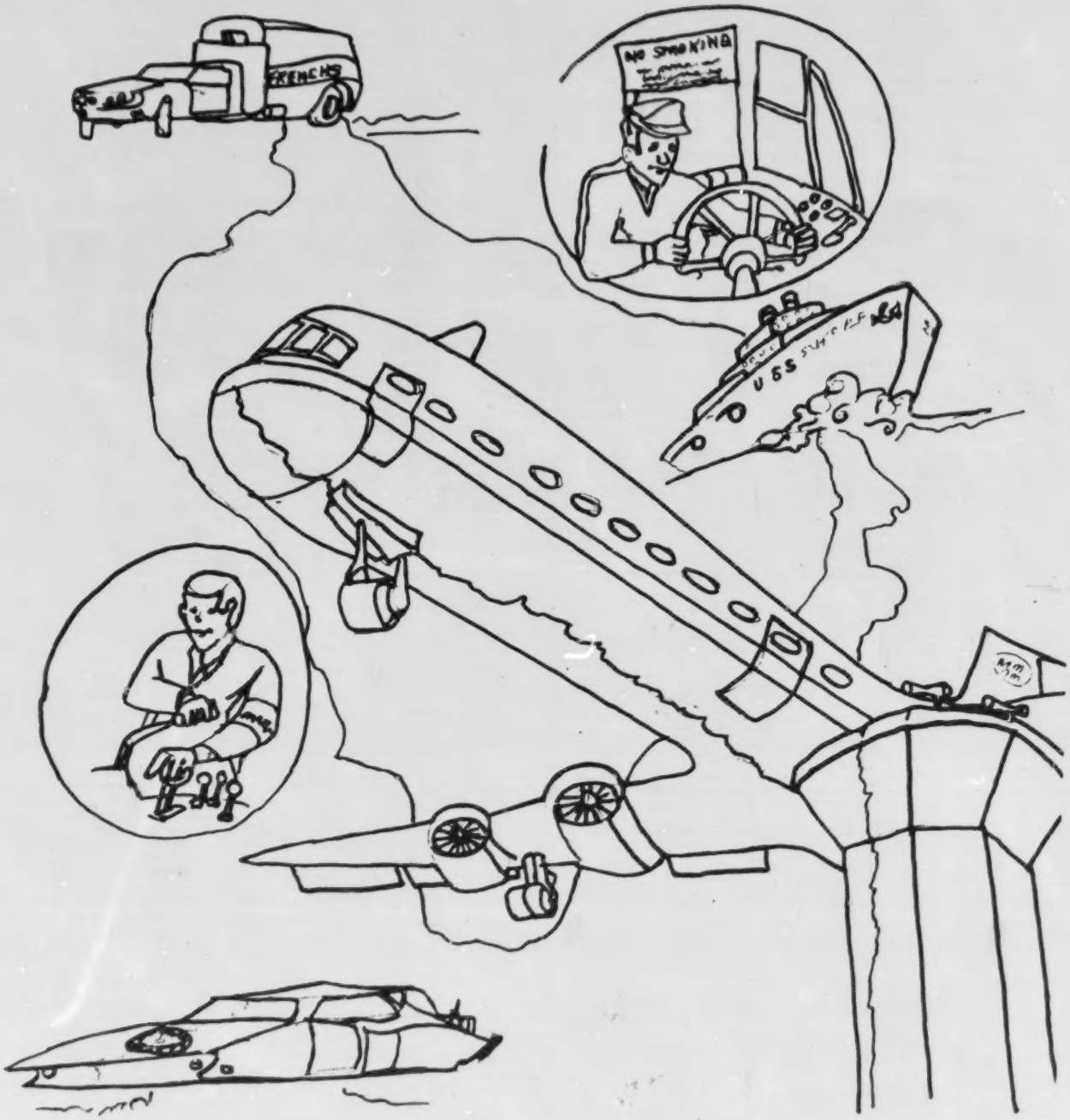
E=Excellent
G=Good

Evaluation	*Pamphlets*	*Source*
G	"Can I be A Craftsman?"	General Motors Public Relations Staff Detroit, Michigan 48292
E	"Industrial Mechanics"	Oregon Cluster Guides Documents Clerk Oregon Board of Ed. 942 Lancaster Salem, Oregon 97303
E	"Career Briefs"	Desk-top Career Kit (see above)

CAREER INFORMATION FOR YOUR FIELDS OF INTEREST


Get recent books and magazines from public or school library.
Go to see the State Employment Offices.
Visit places of work.
Know your Social Security Number and Laws of U. S. Department of Labor.
Practice writing letters of application. Keep your resume up to date.
Do volunteer work.
Keep up with changes in the working world.
Attend classes in careers and related subjects.
Interview friends, relatives, neighbors, civic, and business leaders.
Make your own visual aids. See films on careers. Clip newspaper articles and want ads
Join clubs. Find hobbies and crafts that tie in with your interests.
Send for government bulletins and information from schools and business leaders.

SECTION F



TRANSPORTATION OCCUPATIONS

81/82

Class Presentation of Concepts and Procedures of

TRANSPORTATION OCCUPATIONS

I. Behavioral Objectives

A. Eighty percent of students will write about Houston's industrial opportunities along the ship channel after they take a free two and one-half hour guided tour of the channel aboard the *M. V. Sam Houston* (Flagship of the Port).

B. Sixty percent of students will compare cargo transporting by air, land, and water. Time, service, and salaries will be analyzed.

C. Ninety percent of the academically able students will research predicted plans for Houston's Super Port, the monorail, and other mass land transportation and or extension of helicopter and 707 facilities.

D. Seventy percent of students will read about predicted changes in the automotive industry.

II. Instructional Procedures

A. Study tours will be included because they will easily point out career opportunities that tie in with all fields of interest and all levels of ability.

B. Student activities will be based on individual interests and abilities of the members of the class.

STUDENT ACTIVITIES

Students will complete two or more of the following activities:

1. Visit the ship channel. Interview two workers and write about their qualifications, duties, advantages and disadvantages of their work.
2. Take notes on speakers in class.
3. Write a two-page report on future plans for transportation.
4. Make a reservation to tour the ship channel on the Sam Houston Cabin Cruiser. (Ph. 225-0671) List the industries along the Channel.
5. Make a poster on transportation.
6. Write the Coast Guard for information on obtaining a job as a seaman.
7. Tape a trainman's story of his work.
8. Visit a bus station. List the workers you see there.
9. Make a model of a new type of train, plane, ship, bus, or truck.
10. List the requirements for becoming a steward or a stewardess on a plane or bus. Give the source of your information.
11. Clip two or more articles about transportation from recent newspapers or magazines.
12. Present a skit that you have written on transportation. Cast your play and produce it.
13. Tape a seaman's story of his work.
14. Make a transparency of proposed highway changes in the greater Houston area. Show and explain your transparency to the class.
15. Tape a truck driver's story of his work.
16. Draw or make models of tools used in two or more transportation jobs.
17. Research the safety methods taught new employees in a field of transportation. You can begin with a story about trainmen found in the appendix of this section. Use your research by teaching the class these safety methods.
18. Display models of trains. Tell the class about the workers on the train, at the station, and in the dispatcher's office.
19. Read about the work of an air traffic controller. Use the facts you learned to put on a skit of a controller at work on a busy Monday morning.
20. Compare beginning salaries of entry level jobs you might like in transportation by air, by land, and by water. List the monthly salaries and chances of advancement. Tell the class which job you prefer.

21. Write a moving company for information on summer jobs. Ask the minimum age, the physical tests, and the duties.

22. Display models of automobiles. Tell your preferences and why.

23. List the people needed to keep buses on the road and describe their duties.

24. Visit the model train club. Make a drawing or discuss what you saw.

25. Write a two page research paper on "Transportation Adjustments If Gas Rationing Occurs."

III. Performance Goals

A. Materials collected and read

B. Tours described

C. Application of knowledge gained to individual students' needs of transportation

IV. Evaluation

A. Summation of completed activities as shown on the wheel

B. Quality of oral and written communication on study tours and in class

Flexible Lesson Plan

First Day—Introduction

Use audiovisual materials suggested in the appendix.

Follow visual program with hand-out of "Transportation—Interdependence" Chart found in the appendix. Use a transparency to aid in the discussion.

Hand out "Student Activities" sheet. Discuss. Make assignments.

Second Day—Study tour to Ship Channel (See appendix.)

or

Guest speaker from air lines, bus company, or trucking business

Third Day—Follow up on tour or speaker

Research on current and predicted transportation jobs

Fourth Day—Students' presentations of activities assigned on first day

APPENDIX

1. Interdependence Chart

2. H.E.W. Chart

3. Stories, Data, Activities*

4. Want Ads

5. Predictions

6. Resources

   a. Study tours
   b. Speakers
   c. Media
   d. Printed Materials

7. Summation Wheel

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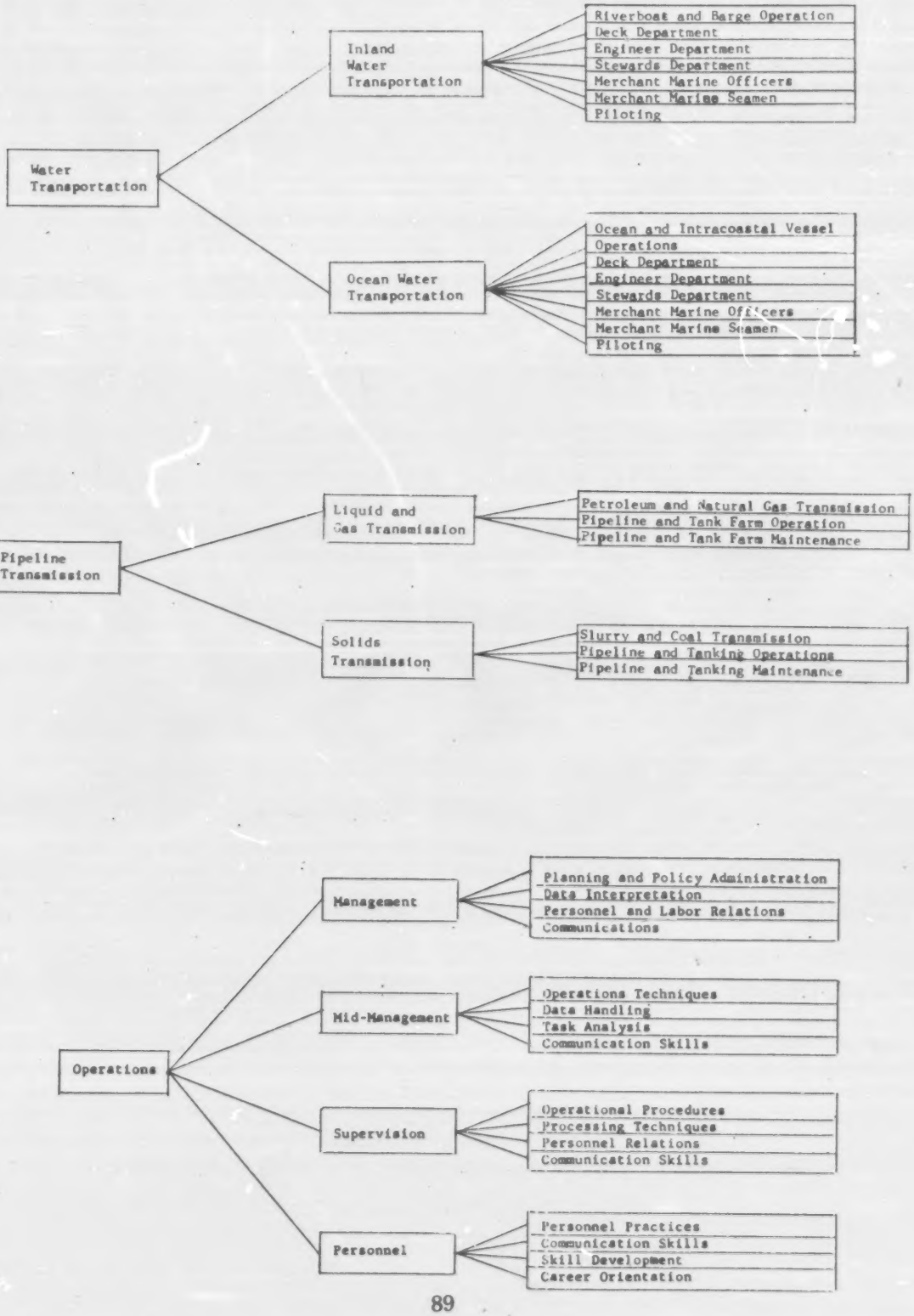
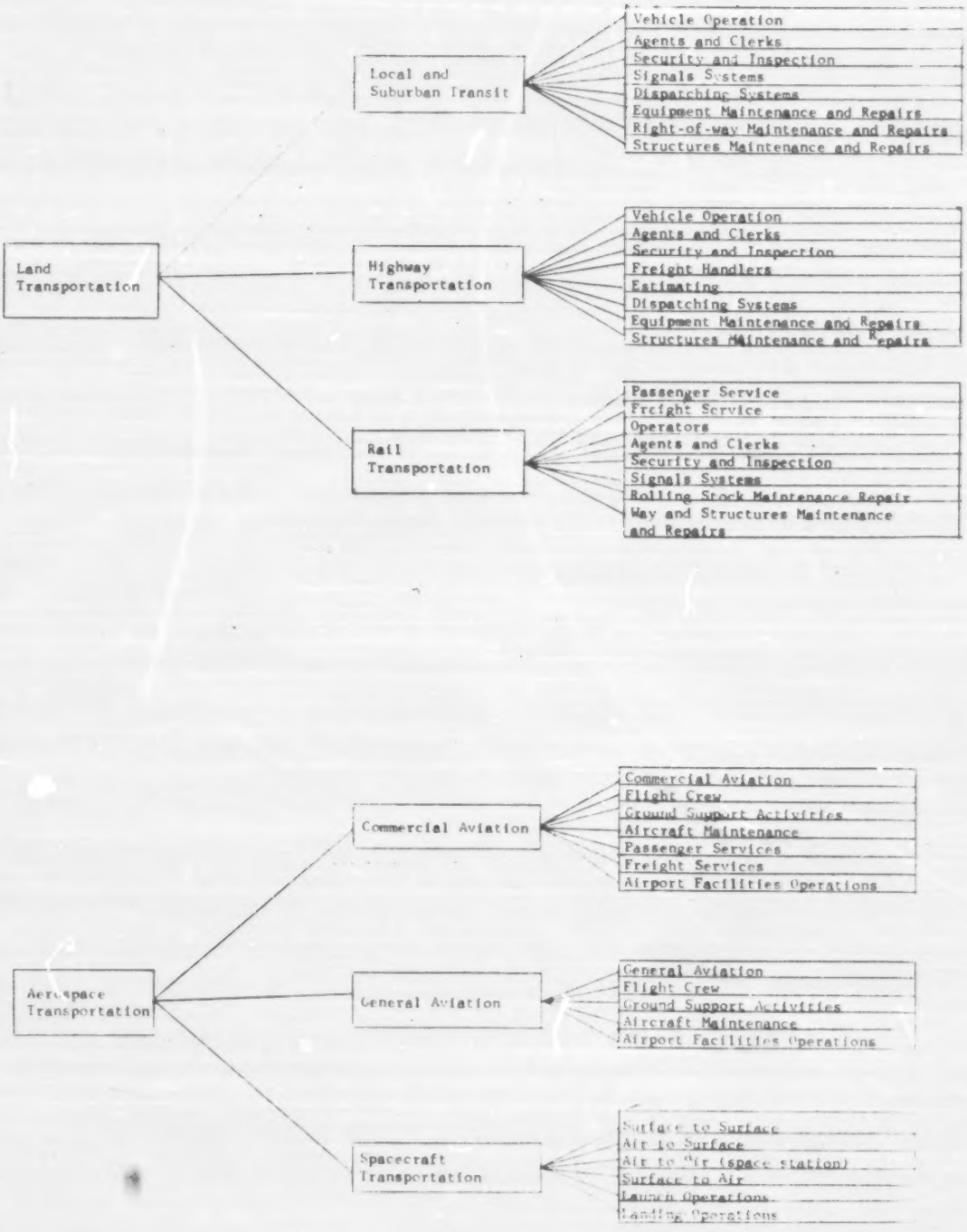
*This may vary with specific subjects in the different careers

TRANSPORTATION—Interdependence (Examples of a Few People and Places)

Projected Needs	Careers		Places of Employment
Ships—Why? National and world markets	Captains Engineers Radio officers Pilots Marine oilers Quarter master	Ordinary seamen Deckhands Able seamen Super cargo clerks Stevedores	Port Steamship companies Steamship agencies Marine maintenance companies Maritime supply companies Party boat companies
Buses Trains Why? Mass transportation and shipments of freight	Drivers Conductors Switchmen Engineers Brakemen Firemen Ticket agents	Dispatchers Administrative officers Consultants for transportational research Clerks Bookkeepers	Railroad companies Railroad contractors Railroad equipment companies Railroad supplies offices Local bus company offices Bus line agencies Bus equipment companies
Automobiles Why? Convenience Urban growth and lack of mass transportation	Chauffeurs Taxi drivers Mechanics	Automobile salesmen Automobile rental clerks Auto parts dealers	Wealthy families Taxicab companies Auto repair garages Automobile dealers Automobile rental agencies
Trucks Why? Small merchandise Heavy freight	Truck drivers Mover's helpers Mechanics	Salesmen Clerks	Heavy hauling truck companies Hot shot truck companies Moving companies Truck repair companies Truck parts companies
Planes Why? Fast transportation	Pilots Co-pilots Stewardesses Stewards Mechanics	Ticket agents Reservation clerks Cargo agents Air traffic controllers	Domestic air lines International air lines Air travel ticket agencies Chartered Air Lines Air safety offices

JOB CLUSTERS




Land Transportation
Local and Suburban Transit
Vehicle Operation
Agents and Clerks
Security and Inspection
Signals Systems
Dispatching Systems
Equipment Maintenance and Repairs
Right-of-way Maintenance and Repairs
Structures Maintenance and Repairs
Highway Transportation
Vehicle Operation
Agents and Clerks
Security and Inspection
Freight Handlers
Estimating
Dispatching Systems
Equipment Maintenance and Repairs
Structures Maintenance and Repairs
Rail Transportation
Passenger Service
Freight Service
Operators
Agents and Clerks
Security and Inspection
Signals Systems
Rolling Stock Maintenance Repair
Way and Structures Maintenance and Repairs
Aerospace Transportation
Commercial Aviation
Commercial Aviation
Flight Crew
Ground Support Activities
Aircraft Maintenance
Passenger Services
Freight Services
Airport Facilities Operations
General Aviation
General Aviation
Flight Crew
Ground Support Activities
Aircraft Maintenance
Airport Facilities Operations
Spacecraft Transportation
Surface to Surface
Air to Surface
Air to Air (space station)
Surface to Air
Launch Operations
Landing Operations

BUS DRIVERS

(Information supplied from an interview with Mr. John Flanagan, Superintendent, Greyhound Bus Terminal, 1419 Texas Avenue, Houston, Texas 77002, fall, 1972.)

Opportunities are open in the bus business if the applicants are qualified. To be sure the qualifications are met, the company spends a considerable amount of money to verify all answers on the application forms. This investigation is done to protect the lives of passengers. A driver with a full load of passengers has the lives of 43 people in his hands. The safety record for the bus company is an example of the high standards that have been set.

To be employed as a bus driver, the applicant must be at least 25 years of age. The physical requirements include 20/30 vision without glasses and 20/20 vision with glasses. Depth and side vision are also carefully tested. Weight should be between 160 and 200 pounds. Height should be between 5 ft. 8 in. and 6 ft. 1 in. Tests include skills needed as a driver. Other tests are given on mathematics, oral and written communication. Every applicant must have a good, clean moral record. His activities in school, at work, and during his free time are all carefully considered. In order to complete the application forms, the prospective employee must account for *all* time during the past ten years. Every 30-day period must be accounted for, and he must furnish witnesses who will verify that his information is correct. Every answer is checked out carefully for the protection of passengers.

If an applicant is accepted, he is sent to a training school in Dallas for three or four weeks. While there, he is given very accurate instructions on safety measures that must be upheld. When he is in school, he is paid $20 a day and furnished a free dormitory room.

After the school work is completed, the new employee is ready for on-the-job training. This period of instruction is under the guidance of a safety supervisor.

After on-the-job training is completed, the driver is ready to go to work. He is paid on a mileage basis and the average pay per month is $1,115. He pays for his own uniforms by having small deductions taken from his check each month.

The new driver is an extra driver at the beginning of his career. This means he does not drive every day. During peak seasons, such as vacations and holidays, he will be needed every day. There are not so many passengers to send out busses in February as there are in summer months, so the new employee must be available for the extra loads that come at peak times. This means the new employee may expect to work seven months a year at first. That means his earnings will be $7,000 per year as a new employee. With more experience, he gains seniority. This means he will have more choices for a regular job. When he has a regular route, he will earn about $1,115 per month *every* month. This means his yearly salary will be $13,380.

Since a driver must have his rest and also must be available for extra jobs, the new employee cannot "moonlight." Moonlighting is working at an extra job before or after hours of the regular job.

One source of extra income for the bus driver is a chartered bus. If a person or an organization wants a special bus to go to a certain place for an event, the bus is *chartered.* If the driver accepts the chartered bus assignment, he stays in the town where his passengers are staying and leaves at their convenience. The driver is given actual, reasonable expenses for his room and board when he is on a chartered trip. On all other trips, the company provides dormitories which are free and gives a meal allowance. The money for meals is based on the miles that are driven. The meal allowance is paid once a year. It is 2 percent of the total miles driven for the year.

A number of fringe benefits are available for the bus driver. His health insurance is $.86 a month for his part of the fees and $45 a month for the employer to pay. These rates are for single drivers. If the employee marries, he pays $8 a month so that his wife is also protected. If he has children, he pays $12 a month. In addition to Social Security, the bus driver gets a good pension which is entirely paid for by his company. At age 60 he may qualify for a pension check that amounts to 50 percent of his regular salary.

The company has also recently introduced a savings plan. If the employee wants to invest his savings back into his company, Greyhound will add to his savings. For every $20 worth of Greyhound stock bought by the employee, the company will match with $4. The company will also pay the *broker's fees.* These fees are monies required by the "go between" men who set up the legal action necessary to put savings into stocks. *Stocks* are people's savings that are being put to use for new ideas, new buildings, or new machinery. It is a system where people trust each other enough to let savings be pooled together for expansion or growth.

A bus driver does not have to spend as many nights away from home as in other traveling jobs. For example, in the Houston areas a bus goes from Houston to Lake Charles, from Houston to Fort Worth, from Houston to Dallas, and from Houston to San Antonio. All of these trips are short; so the driver would not be away from home more than one night on a trip.

This career involves a service where people help people. It requires mental ability, kindness, and steady nerves. The rewards include good pay, vacation time from one to six weeks, and the satisfaction that comes on a person-to-person basis when people enjoy helping each other.

TRUCKING

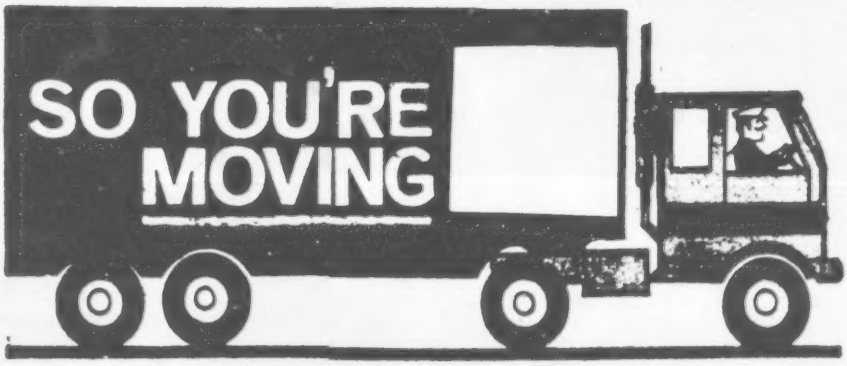
Moving freight by trucks includes many jobs. Entry level opportunities are always available for strong men who are in good physical health and willing to work.

One example of hauling that is very important to the Houston area is the heavy hauling truck business that moves oil field equipment. Transporting heavy equipment means a great deal of money is involved, so the employees must know what they are doing. Interstate Commerce in Washington, D. C., sets up the truckers' tests that must be passed before a trucker goes to work. Also the employee must pass rigid physical examinations. The minimum age for employment in heavy hauling is 21. These employees belong to the Oil Field Haulers Association.

Another kind of hauling that requires special skills is a local service that takes products from the port or the freight trains to the destination. A commercial driver's license is required. Sometimes the total cost of the vehicle is forty to fifty thousand dollars. Only dependable people can be hired.

A hot-shot delivery is a quick short trip to move merchandise. Requirements for these drivers are not so strenuous as those for moving heavy equipment, because the trucks and the products are not so expensive.

Moving vans have steady business because the population of the United States is on the move. Wald Transfer and Storage Company is a local branch of Mayflower Moving-Storage. This company will hire a physically fit, ambitious man to begin work as a helper at $3 per hour. He must be 20 or 21 years of age and willing to work hard. He may be sent to Mayflower's School for Professional Movers, which is located in Indiana. If the helper proves his ability after a year or two, he may be promoted to a driver. The driver has a great deal of responsibility. He must see that the crew packs and unpacks correctly, and he must be a safe driver. The driver may expect to make about $10,000 on short trips, but with more experience he will make longer trips, and his salary will be between $15,000 and $20,000 a year. The driver at Mayflower will become self-employed, as the company will help him finance payments on his moving truck. He will call the dispatcher when he finishes a job, and if another job is available in the city where he completed the job, he will then begin packing and move on to another place. Sometimes a driver may be away from home a couple of months or longer at a time. According to Mr. Paul Clark, transportation supervisor at Mayflower, the drivers do not mind the long trips or the time away from home because they are paid very good money for their work.



BY JANE HALE ROMMEL

Transportation Tips

SEVERAL DAYS BEFORE YOU MOVE

• Re-confirm "M" day with your mover. Ask for instructions to assist you in getting ready for packers. Have an understanding about mover's liability for loss or damage to your effects which is limited by law. Be sure to declare the full value of your shipment. If you order packing service, your mover will have trained packers prepare the shipment and pack in strong cartons. Plan to be at home when the packing is done.

• Arrange to take down venetian blinds, draperies, traverse rods, window cornices, television antenna, etc. Remove carpet tacks, but do not take up carpets. Charges for such services are not included in the transportation rate and will be extra.

• Movers are governed by certain regulations. They assume no responsibility should articles such as the following come into their possession without their knowledge: Explosives (cleaning fluids, matches, paint, fireworks, gasoline, kerosene or ammunition); jewelr and precious stones, postage stamps or stamp collections, revenue stamps, coins, currency, letters, valuable papers, etc. Dispose of or arrange for other means of transfer for these items. Remember to drain the fuel from power mowers or other machinery (outboard motors, etc.)

• Dispose of half used cans and bottles of food products which might leak and cause damage. If necessary to move any liquids, wrap separately in individual waterproof packages and label for packers or movers.

• Check cleaner or other storage for furs or seasonal clothing. Remember shoes at repairman's or sporting clothes and equipment at the club in lockers.

• Arrange for sufficient cash or travelers cheques to cover the cost of moving service and expenses until you make banking connections in the city to which you are moving.

• Have appliances serviced for the trip—home freezer, refrigerator, air-conditoners, gas incinerators, washer and dryer, television sets, kitchen and attic fans, garage door openers, hi-fi sets, communications systems, etc. Remove TV antenna.

• Arrange for travel tickets or obtain maps for automobile trip.

• Make plans to spend the last night with a friend or at a hotel when the utilities are disconnected.

• Make arrangements for house to be cleaned after everything is packed and moved out of the house or apartment.

• If you are shipping your automobile, make necessary arrangements. Your keys and a duplicate copy of your registration certificate should accompany your car. Remove all tools and items except your spare tire and tools neessary for the changing of a tire.

• If you are crating and shipping a pet, pick up the crate and let your pet get acquainted with his temporary home-to-be. Some suffer shock upon being closely confined in a box and shipped. He will be less afraid when he starts his journey.

• Dispose of plants since they will probably not survive the trip by van. A valuable or unusual plant should travel by Railway Express or with you in your automobile. Take along a nursery inspection certificate which might be required, if your move is interstate.

• If you are doing some of your own packing, get as much done as possible before the packers come to finish up the day before you move.

• If you are traveling by car remember to take along: Tools for repairs, flashlight, flares, litter bags, rope, first-aid kit, sun glasses, hair scarves, pillows, and snacks and entertainment items to keep children occupied.

RAILROADS

(Notes taken from interview with Mr. H. R. Matrisciani, Assistant Personnel Director at Southern Pacific)

The railroads were a glamorous method of transporting people a generation ago as the fabulous 747 Jets are today, but the part that railroads are playing in today's world is just as bright and important as it was twenty years ago. The future, too, holds many challenging opportunities, for railroad careers pay excellent starting salaries and give many opportunities for advancement.

The excitement today in the railraod business is in the methods of management and fair play for all employees who try to do a good job. Railroad leaders know how to diversify business so that new ideas and new incomes are always moving into the money picture.

Diversify means changing and adding new ideas. Sometimes new services and/or products are added to a business establishment. An example of Southern Pacific Railway's diversified business is ownership of the world's largest communication system. It can transmit 50,000 messages at a time.

Good pay and good training are two reasons the railroad can always find good employees. The personnel director examines applicants' abilities and finds a job best suited for them.

The railroad divides jobs into three main categories:

Operating jobs — engineers, switchmen, firemen, brakemen

Non-operating jobs — clerks, secretaries

Mechanical jobs — mechanics

A secretary must pass 40 words per minute on a manual typewriter or 60 words a minute on an electric typewriter. These tests must be done with 90 percent accuracy. She must also take dictation at 60 words per minute as the minimum speed, but 80 words per minute is the preference. After completing 4 to 14 days of in-service training at $12.80 per day, she is placed on regular duty. Her salary is $775.00 per month as a beginning secretary.

She will be in a typing pool where she will follow instructions and be under close observation. When she proves that she is ready to work without close observation, she is interviewed as an *excepted* secretary. This means all secretaries are in a union except for those rated as *excepted*. They are administrative secretaries, and their salaries jump high, but their responsibilities also jump. Another example of salary for a clerical worker is the keypunch operator. She will begin at $816.00 per month.

In the field of operating jobs, student brakemen will be given an apprenticeship for mechanical training. They will get on-the-job training and spend time learning from people who are experienced. They may advance to assistant train master. Again they need more training. They will spend various lengths of time in different railroad jobs. They must all put on work clothes and

know what it is like to work with the men on the job. The next promotion is a full station master. The minimum salary for a station master is $1,400 a month. The pay increases with experience.

Engineers are the "drivers" of the engine. They are sent to California for intensive training. During the 14 days in California, the engineer trainees are taught on equipment that has been built to have the same sway, motion, noise, and vibrations that will occur on an engine. If there is a physical problem, it shows up in training so no one gets hurt. While in California, the engineer trainees are given a beautiful place to stay. Southern Pacific wants the men to be well trained and relaxed.

Southern Pacific is doing well and wants to share their benefits with others. They believe there is a saleable skill in everyone, so they go into the high schools each spring to get recruits for their learning disabilities school. There is something good in everyone, and results of this school have been very rewarding.

Methods of management have been so successful in the railroad business that many times foreign countries turn to railroad leaders for guidance. Probably the main reason for their success is summed up in Mr. Matrisciani's statement "every officer here started at the lowest level."

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AP Wirephoto

DOWN THE RIVER

Officials in a small motor boat scout the Minnesota River ahead of a barge carrying a 106-year-old Methodist church being moved from Bloomington, Minn. The 50-ton building went seven miles in three hours. A tug is pushing the barge from the other side.

Missouri Pacific Pays Water Pollution Fine

Missouri Pacific Railroad Co. has paid a $500 fine for water pollution from its Settegast Yard off N. Wayside.

The company pleaded no contest Thursday before County Criminal Court Judge Jack Treadway to discharging industrial wastes into Hunting Bayou June 9.

The discharge, from cleaning operations in Missouri Pacific's yard, contained chemicals, oil and grease and was toxic to fish, said Rod Gorman of the district attorney's pollution section.

The firm has since installed equipment to divert the cleaning wastes into city sewer lines, Gorman said.

AIR LINES

(Notes taken while interviewing Mrs. Ann Johnson, Eastern Airlines)

Many exciting opportunities are open to those who qualify for careers with airlines.

The careers asked about most frequently are those of pilots, stewardesses, stewards, and reservation clerks. All of these jobs require training and self-discipline. The rewards are high; so the competition is keen.

A pilot must be between 5 ft. 8 in. and 6 ft. 4 in. in height. His weight must be in proportion to his height. The minimum age for a pilot is 21. His vision must be 20/20 uncorrected. He will need at least two years of college, and a United States Federal Aviation Administration Commercial License with an Instrument Rating. In order to get this license, the prospective pilot needs to have many hours of flying experience. He may be trained for this by private schools but they are very expensive. San Jacinto Junior College is the only known public college that offers the pilot's training at this time, according to air line representatives. To obtain free training as a pilot, one can enlist in the United States Air Force.

Pay is excellent, working conditions are good, and free air travel is offered to the pilot, his wife, children under 21, and his parents. A pilot will need to study changes in equipment and be able to prove his ability at all times. This is why the air lines have a very good safety record.

A stewardess (a girl) and a steward (a boy) serve the passengers, render first aid and if needed, assist with physical or emotional problems that might occur enroute to a destination. This position requires that the employee be able to administer oxygen and operate emergency equipment. The physical requirements are the only differences made in the steward and the stewardess. The steward must be 5 ft. 6 in. to 6 feet in height. His weight must not be less than 124 pounds nor more than 184 pounds. The minimum age is 20. A stewardess must be not less than 5 ft. 2 in. nor more than 5 ft. 9 in. in height. The minimum weight for stewardess must be over 100 pounds. The maximum is 140 pounds. The minimum age is 20. Both the steward and stewardess will need to have good posture, good carriage, and a flawless complexion. Any facial scars or growths would cause difficulties in being hired. The teeth must be straight and white. Hair and general appearance must show a total picture of good grooming.

To prepare for a career as a steward or stewardess, the following courses are suggested: first aid, psychology, English, physiology, nutrition, homemaking, hygiene, speech, geography, music, art, current events, and a foreign language. A domestic air line suggests French or Spanish. If the plane goes into Canada, French is needed, and if it goes into Mexico, Spanish is needed. In order to be promoted to a Senior Flight Attendant, a speaking knowledge of French or Spanish is needed. Ability rather than length of time determines promotions. When a person is assigned to train, a job will be waiting. The training time is about five weeks. During that time there is no salary; however, room, board, instructions, and $2 a day for spending money are given. At the end of the training, the new steward or stewardess will be expected to buy his or her first uniform. After that, all uniforms are furnished. The first uniform will not be paid for all at once. A small amount of money will be taken out of each pay check until the uniform is paid for.

The beginning salary for a steward or stewardess is $500 as of September, 1972; however, expenses for cabs, hotels, and laundry are also paid. These added expense checks are tax free. Health and life insurance are also provided by the company at little or no cost to the employee. Free plane tickets are provided for the close relatives of stewards and stewardesses. The close relatives include parents, husband or wife, and children under 21.

Promotions are given when employees bid successfully on jobs. They learn about new openings in places they want to go or on jobs they like. If they have prepared themselves for these opportunities with knowledge, skill, and a willingness to get along, they will probably be promoted.

Another much sought after job is the reservation desk clerk.

Some of the organizations associated with the air lines are for work and some are for pleasure. One such organization is Air Line Pilots and Stewardesses Union. One example of an organization for leisure time is the "Clipped Wings." After a girl marries and has a family, she usually does not want to travel and leave her husband and children; so she stays in the community and meets with other ex-stewardesses who belong to the "Clipped Wings." They have a good time, but they also provide money and services for charity.

If you like meeting new people, seeing new places, maybe the air line companies are for you.

Test on Air Lines

1. Minimum age for a steward or stewardess is _____ .
2. Physical requirements for a steward are _____ _____ _____ _____ .
3. Physical requirements for a stewardess are _____ _____ _____ _____ .
4. Requirements for becoming a pilot are —
   Physical _____
   License _____
5. A prospective pilot can obtain training for a license in several ways. Examples of places to go for training are—
   (1) _____
   (2) _____
6. Subjects a person should have studied if he or she wants to become a steward or stewardess are
   _____ _____ _____ _____ _____ _____
   _____ _____ _____ _____ _____ _____
7. Two examples of airline organizations are
   _____ _____

WATER TRANSPORTATION

(Notes taken from interview with Mrs. Jane Berry, Office of Labor Relations, West Gulf Maritime Industry.)

To find employment aboard ships, the applicant must first report to one of the American Flag Vessels Companies. Examples of these companies are Lyke Brothers and Delta Steamship Company. If the American Flag Vessel Company agrees to hire the applicant, he must then report to the Coast Guard for testing. If the Coast Guard finds that the applicant meets qualifications for employment, he is given *Z* papers. These papers will include his employee number and help simplify the paper work needed when he works on various trips. The employee agrees to the terms of one voyage at a time; so his monthly salary varies.

Some employees belong to unions. Examples of water transportation unions are National Maritime Union (N.M.U.) and Seafarers International Union (S.I.U.).

Entry level jobs are seamen or deckmen. The highest paid employee aboard the ship is the captain. Salaries and working conditions of various jobs aboard ship are explained in a story under Marine Science in the appendix.

BEST COPY AVAILABLE

SEAT BELTS One of the most shocking, stupid, flagrant omissions of common-sense safety precautions is the refusal of the Federal Highway Administration to make mandatory the installation and use of seat belts in passenger buses.

Seat belts are required in aircraft and automobiles but not in buses.

Why?

The National Transportation Safety Board says in its Annual Report:

"The Board, for the past three years, has recommended repeatedly that bus passengers be given the chance to protect themselves with seat belts or similarly effective restraints."

But the bus companies and governmental safety regulators continue to ignore the recommendation.

Secretary of Transportation John Volpe is the man to write to if you are wondering why the lives of passengers who ride in buses are presumably less valuable than those who ride in planes and private cars.

BEST COPY AVAILABLE

New Safety Laws Would Mean New Jobs.

Name some of the careers that would be involved in safety belts.

Houston Post—Parade
Oct. 15, 1972

AP W[illegible]

GIRL STEVEDORE

Chinese girl operates a fork lift recently in Shanghai, China's biggest port. There are some 30,000 dock workers in Shanghai. In one district that has 2900 workers, 420 are women. Women are assigned lighter work and retire at age 50. Men retire at 55.

Name new transportation jobs for women in the United States.

BEST COPY AVAILABLE

Financing Is the Major Issue In Proposed Rapid Transit System

BY TOM STEACY

Chronicle Staff

The major issue in the city's proposed $1.5 billion rapid transit system is the financing.

How will the city pump up its share of the money to build a system of elevated and subway trains and express freeway lanes for buses?

The federal government is expected to pick up two-thirds of the tab. Mayor Louie Welch favors an axle tax on cars and trucks in Harris County to raise the local share.

Anticipated revenue from such a tax is estimated at $6.6 million a year. That money would pay the principal and interest on obligation bonds sold to finance construction and equipment costs.

The mayor proposes a $5 fee on low to medium weight cars; $7.50 on heavier cars, and $18-20 on trucks.

However, before any construction can begin, the Texas Legislature must approve a transit authority that would build, operate and finance a rapid transit system. It would be a separate governmental entity with taxing powers. Voters must approve the form of taxation before the authority can impose it.

The city is waiting to receive the final plan for the system, now under review by the U.S. Department of Transportation.

Alan M. Voorhees & Associates, a transportation consulting firm from Virginia, designed the transit plan.

The system would be developed in two stages, with completion at least 15 years away.

Stage One includes a two-mile subway train under Milam, Travis or Main. Feeding into it would be lines from four elevated trains in outlying areas.

The elevated routes would be along the Eastex Freeway to Loop 610, along Katy Freeway to the Silber-Antoine Roads area, along the Southwest Freeway to South Post Oak, and along a Wheeler-Elgin Streets corridor to the Texas Southern University-University of Houston area.

The proposed routes are defined by general corridors several blocks wide. City officials explain that this is to keep land speculation to a minimum in those areas while the system is being finalized.

Three to five passenger stations are planned for each route.

The specific routes and station sites will be announced shortly before right-of-way is bought, city officials say.

Express Bus Lanes

The trains, with airline-like interiors, would run on either steel wheels and rails or rubber tires and concrete runways.

Also in the first stage would be construction of express lanes on three freeways for bus use only. These roadways (also called busways) would enable buses, operating in outlying neighborhoods, to make direct and faster connection with downtown on special, traffic-free lanes.

Busways are planned for the Gulf Freeway from Park Place or Bellfort with access points at Calhoun or Wayside; along the North Freeway from Crosstimbers with access ramps at Loop 610 and Cavalcade or North Main, and along the proposed South Freeway (Almeda Road) to Holmes Road.

The Voorhees study recommends the current public transit fare (45 cent base with zone charges to 70 cents) be maintained for Stage One.

In Stage Two, the four train lines and three busways would be extended several miles. New busways would be built from downtown along the East Freeway to Loop 610 and along the Harrisburg-Ship Channel corridor to Loop 610. When this construction starts depends upon availability of funds.

The report also lists future route extensions into adjacent counties, which would help with financing.

The Voorhees study also recommends that the city take over the bus company and set more priority lanes in downtown. These proposals could be initiated during the next five years.

The total construction and equipment cost for Stage One is about $795 million and $655 million for Stage Two. Planning for Stage Two financing is still several years off.

Graduated Scale

The transit authority's share for Stage One would be $265 million for construction and equipment. The authority would also have to pay an additional $25 million in operating expenses during the 10-year Stage One.

The authority would finance the needed $290 million on a graduated scale over 10 years. For example, during the first year, the authority's share would be more than $4 million and in the fifth year more than $36 million, says Tom Tyson, city public service director.

The anticipated annual revenue from the proposed axle tax would be about $6.6 million. That would produce enough money to finance the first year or two on a pay-as-you-go basis, Tyson estimates.

But after that, the authority would have to issue obligation bonds to raise the money needed to pay its share of construction, equipment and operating costs.

Bond funds would be used for construction, equipment and operating costs. The proposed axle tax revenue would then be diverted to pay the principal and interest on each year's bond issue.

With $1 million in tax revenue, the authority could pay for a bond issue that would raise $12 million, explains Assistant City Controller Roland Brunet. This would enable the authority to maintain a lower tax rate than it could on a pay-as-you-go basis.

New Taxation—Welch

Mayor Welch says "there is no way we can build the system without some new form of taxation that would be completely dedicated to paying for rapid transit." He adds that it would be unrealistic to increase the property tax.

Tyson says the axle tax probably would support the first half of Stage One. After the fifth year, he says another form of tax would be added to meet the costs.

But, he adds, the city may propose a single form of financing for the entire Stage One instead of several tax forms.

Other cities are financing rapid transit systems with sales, gasoline, cigaret or property taxes.

The mayor says several alternate financing plans may be proposed and City Council would decide which to use. Welch says he hopes to present the rapid transit plan and financing proposals to City Council before the end of the year.

City Atty. William Olson says the city will ask the Texas

* * * * *

Legislature early next year for enabling legislation or a constitutional amendment to authorize the establishment of a transit authority.

He says a transit authority would be created to carry out construction, operation and financing of the system.

James Edmonds, an aide to the mayor, says Harris County's 24-member legislative delegation will be contacted about the project after the November elections.

After financing, Mayor Welch says the next greatest concern is the time it will take to start and complete the system. One of the first important time hurdles lies in the state legislature, he said.

Houston Chronicle
Oct. 29, 1972

TRANSPORTATION PREDICTIONS

Elevated, Subway Trains, Freeway Buses in System

The proposed rapid transit system is a network of elevated and subway train routes and freeway express bus lanes.

The network would take at least 15 years at the earliest to complete.

Work on Stage One — four elevated train routes linked to a downtown subway, and three traffic-free routes for buses — could start by late next year.

Work on Stage Two is about five to seven years away, if financing is available at that time.

Proposed Routes—Stage One

(Train routes are indicated by corridors several blocks wide. The exact routes will not be announced until shortly before the right-of-way is bought.)

DOWNTOWN SUBWAY — Under either Milam, Travis or Main from Buffalo Bayou to Elgin. Three stations are proposed (no specific station sites on any train route have been determined). The four other train lines, all elevated, will feed into the downtown subway. Construction start target is early 1976 and completion by 1980.

NORTHEAST ELEVATED TRAIN—From downtown subway's north end, this route runs along the north side of the downtown freeway loop, crossing the Eastex Freeway toward Lyons Avenue. Then it swings north along the Eastex-Hirsch Road corridor and ends at Loop 610. Three or four stations are planned. Construction start, late 1976; completion, 1980. (Stage Two of this route would extend the line four miles to East Little York. The completed route would be a main rapid transit artery to Intercontinental Airport.)

KATY TRAIN — From the downtown subway's north end, this line would be along the north side of the downtown freeway loop and out the north side of Katy Freeway. It would end in the Silber-Antoine roads area. An alternate corridor would be along Washington and Center streets to the north side of Katy. Five stations are planned. Construction start, late 1976; completion, 1982. (In Stage Two, this line would extend to Dairy-Ashford.)

SOUTHWEST TRAIN — From the downtown subway's south end, this line would run along the Richmond Avenue corridor and end at South Post Oak. Four stations are planned. Construction start, late 1976; completion, 1980. (Extension to the proposed West Belt is scheduled for Stage Two.)

SOUTHEAST TRAIN — From the downtown subway's south end, this route would be in a corridor bounded by Elgin and Wheeler and run to the University of Houston-Texas Southern University areas. Two or three stations are planned. Construction start, late 1976; completion, 1982. (Three more miles will be added in Stage Two along Mykawa Road and Telephone Road to Loop 610.)

GULF FREEWAY BUSWAY — Lanes added to the freeway from downtown to Park Place or Bellfort. Intermediate access points are planned for Calhoun or Wayside. Route to be operational by 1978.

NORTH FREEWAY BUSWAY — Elevated roadway in the North Freeway right-of-way from the Washington-Smith-Louisiana area to Crosstimbers. Additional access points are planned for Loop 610 and Cavalcade or North Main. Operational by 1977. (Stage Two plans an indefinite extension north.)

SOUTH FREEWAY BUSWAY — A part of the proposed South Freeway along Almeda (State 288). The lanes would originate downtown and extend to Holmes Road. Operational by 1977. (Stage Two would take busway to Reed Road or Airport Boulevard.)

Stage Two Projects

EAST FREEWAY BUSWAY — An elevated roadway from downtown portion of northeast train along the East Freeway right-of-way to Loop 610.

HARRISBURG FREEWAY BUSWAY — In the Harrisburg-Ship Channel corridor from downtown to Loop 610.

WEST LOOP — A 12-mile train line or busway along West Loop 610. To the north the route will extend to West Little York near Acres Homes in the Post Oak-Mangum roads corridor. To the south it will be in the right-of-way of the proposed Bay City Freeway to south Main.

A construction timetable for Stage Two has not been set.

Says Engineer

Commuters Could Save With System

The average commuter in the United States could save about $436 annually by using a rapid transit system instead of his car.

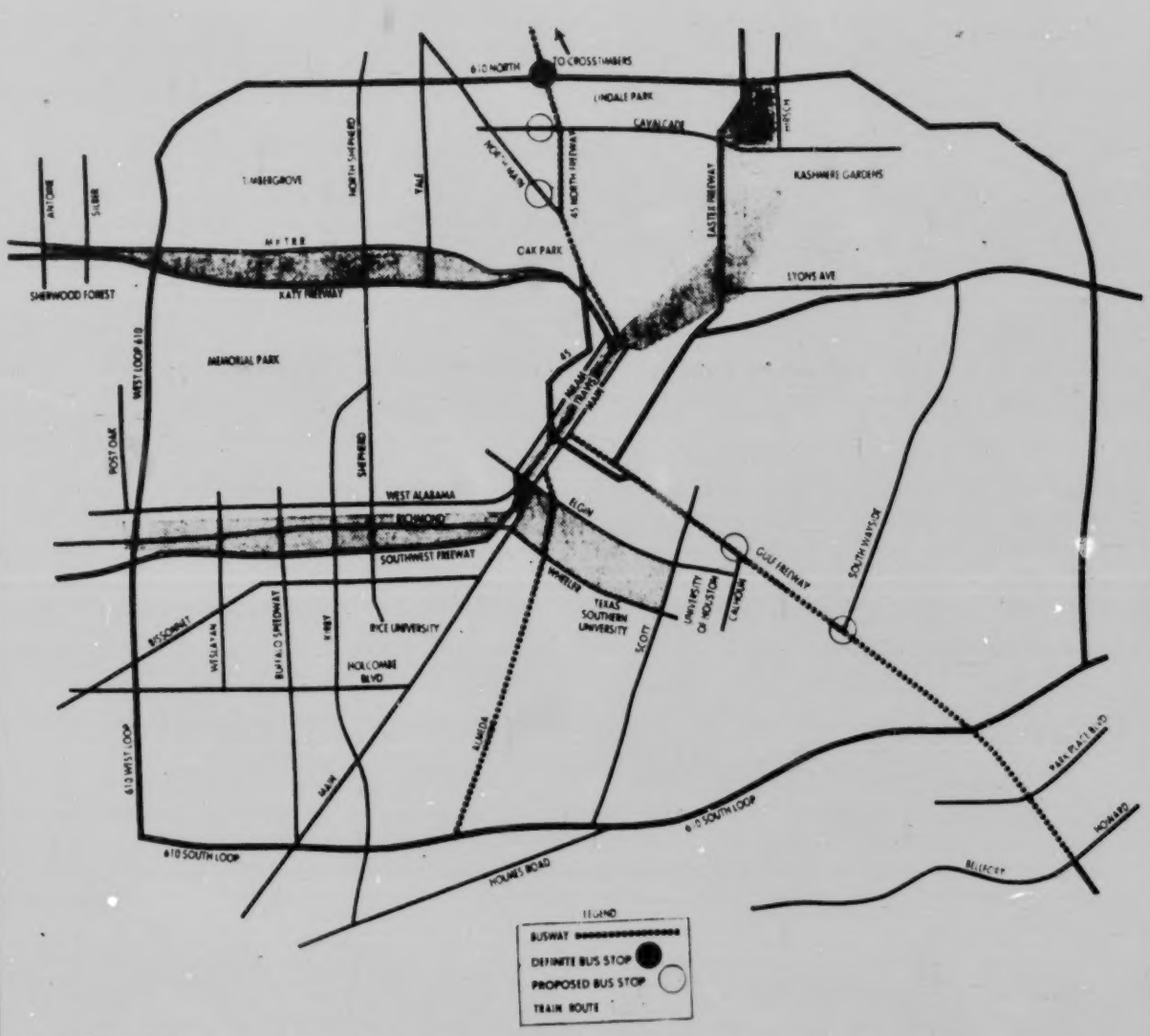
Jack Ross, a transportation engineer for Boeing Co., said research has shown that the yearly cost of operating a car is about $660 and the annual cost of using a high-speed transit system is about $224.

He spoke Saturday at the Houston-Galveston Area Rapid Transit Conference at the Houston Museum of Natural Science.

Ross pointed out that it is cheaper to operate a rapid transit system than a conventional bus system in downtown traffic.

The engineer said that to run a bus in congested city streets costs about $1.80 a mile. If that bus would operate on only traffic-free lanes especially for buses, the cost per mile would be reduced to 30 cents.

Houston Chronicle
Oct. 29, 1972



Houston Chronicle Map

STAGE ONE OF HOUSTON'S PROPOSED RAPID TRANSIT SYSTEM

Until the transit authority is created, construction cannot begin, says Joe Laughlin, Tyson's top aide for the transit program.

If emergency legislation were adopted, the authority could be established by late next spring.

'Most Realistic' Way

If the constitutional amendment route is used, both houses would have to approve the proposal and then it would be placed on the statewide ballot in a general election, says Olson. He adds that election could not be until 1974.

But he points out, the Texas Legislature could declare a special election, as early as next summer, in which the transit amendment would be on the ballot.

He says the city will probably follow the constitutional route because it would be the "most realistic approach" to setting up the authority.

After state approval in one form or another, the method of financing would be put to the voters of the area covered by the tax. Olson says public hearings would be held on the transit system before that time.

Houston Chronicle
Oct. 29, 1972

AUTOMOBILE MECHANIC

Do you like to work with tools and machinery? And are you good at fixing things with your hands? If so, you may want to be an automobile mechanic.

ABOUT TRAINING

Automobile mechanics usually learn the trade on the job. Others learn by

- working as an apprentice
- fixing cars as a hobby
- taking vocational and trade school courses

A beginner can learn to do simple repair work in a few months. Three to four years are required to become an all-around mechanic.

Check with the local office of your State employment service to find out if the government sponsors a training program in your community.

TO QUALIFY

You must

- work well with your hands
- be good at putting parts of machinery together
- have a driver's license

You should not mind

- working with dirty and greasy parts or
- working in cramped positions

Though not required, a high school diploma increases your chances of getting a good job and of being promoted. High school courses in math and science are helpful.

CHANCES FOR PROMOTION

Experienced mechanics can be promoted to supervisory jobs such as

- repair shop foreman or
- service manager

Some experienced mechanics open their own shops or gas stations.

THE PAY

The national average pay for *experienced automobile mechanics* is about $5.00 an hour. Rates vary with the section of the country.

U.S. GOVERNMENT PRINTING OFFICE

AUTOMOBILE BODY REPAIRMEN

Would you enjoy turning dented automobiles into cars that look like new? If so, you may want to become an automobile body repairman.

THE PAY

Earnings of body repairmen depend on their experience and on the part of the country in which they work. The national average pay for experienced body repairmen is about $5.50 an hour. Beginners start at lower rates.

THE JOB OUTLOOK

Nationwide, during the 1970's, several thousands of jobs will be open each year for new workers in this trade.

ABOUT TRAINING

Automobile body repairmen learn the trade through

- apprenticeship programs
- on-the-job training, usually starting as helpers to experienced workers

Training for an all-round auto body repairman requires 3 to 4 years.

Check with the local office of your State employment service to see if the government sponsors a training program in your community.

CHANCES FOR PROMOTION

An experienced auto body mechanic may become a shop foreman. Some body repairmen open their own shops.

WORKING CONDITIONS AND BENEFITS

Most body repairmen work 40 to 48 hours a week.

They work

- in shops that are noisy and dusty
- often in cramped positions
- with greasy, dirty auto parts
- in some danger from power tools and torches

Many body repairmen receive

- paid holidays and vacations
- life, health, and accident insurance

Some employers contribute to retirement plans.

Many automobile body repairmen belong to unions.

U.S. DEPARTMENT OF LABOR
Bureau of Labor Statistics/Manpower Administration

FLY the Wings of Man as an

EASTERN

STEWARDESS/STEWARD

Eastern Airlines has immediate opening for Stewardess/Steward. Following a 5 week training course, conducted in Miami, Florida, you can be assigned to any one of (8) cities where your duties will be to provide in-flight services aboard our modern jet aircraft. If you enjoy traveling and meeting people, apply now as an Eastern Stewardess/Steward.

To qualify you should be:

SINGLE • PERSONABLE • ATTRACTIVE

(Weight in proportion to height)

IN GOOD HEALTH

(Able to pass Eastern's Physical Exam, including 20/40 vision, or 20/200 corrected to 20/40 with contacts) AT LEAST 20 YEARS OF AGE

CONVERSATIONAL SPANISH DESIRABLE

Interviews will be held on Saturday, September 30 at THE EASTERN BUILDING, 2nd floor, One Greenway Plaza East. Apply in person between 9 A.M. and 4 P.M., or write to:

SUPERVISOR, RECRUITMENT PROGRAMS

EASTERN AIRLINES

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Houston Chronicle– 9-24-72

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PAPERHANDLER

THE HOUSTON CHRONICLE is seeking an experienced Diesel truck driver and towmotor operator. All driving will be local. Must have commercial license and be in good physical condition. Will work Monday through Friday from 10 P.M. until 7 A.M. If you have adequate work references and are seeking a good steady job with above average salary, please apply in person to our

PERSONNEL DEPARTMENT

Room 516, Chronicle Building

801 Texas Avenue

Interviewing Hours 8:30 A.M.-11:30 A.M.

or 1:30 P.M.-4:30 P.M.

Houston Chronicle– 9-25-72

Sales Trainees

The Shippers' Car Line Division (Sales and leasing of railroad transportation equipment) of ACF Industries, Incorporated is seeking candidates for entry level sales positions. Successful candidates will receive on-the-job training at the home office in St. Charles, Missouri and/or at selected field sales offices depending on the candidate's level of sales experience and familiarity with the railroad transportation industry.

Please respond by mail only and forward a complete resume including salary history to: Mr. T. L. Cahall, Personnel Manager

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St. Charles, Mo. 63301

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Houston Chronicle 9-25-72

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6. **Uniforms furnished**

If you have a good driving record, know the city and have Diesel & tractor trailer experience we want to talk to you.

Inquire at

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Houston Chronicle
Oct. 8, 1972

DRIVER

Must have Texas commercial license and 1 year recent experience on city delivery routes. Must be able to work weekends. Hours, 8-5

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Houston Post
Oct. 15, 1972

- Locate private schools that train people for careers in transportation. Use the yellow pages of the phone book.

TRANSPORTATION STUDY TOURS

Ship Building

TODD SHIPYARDS CORPORATION—Houston Division
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Description:
New marine construction and ship repair.
Specifications:
Welcome students, U.S., adult groups; Minimum 5; Maximum 25; need one week advance notice; some plant areas and certain information restricted to all visitors, tours narrated; special discussions available on request; prefer touring 9 a.m. to 3 p.m.
Tour classification: By arrangement only.

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PORT OF HOUSTON
Gate 8, Clinton Drive
Contact: Mrs. Yvonne Brieger
P. O. Box 2562
Houston, Texas 77001
225-0671

Description:
Operating wharves of Port of Houston.
Specifications:
Welcome tourists, students, U.S. and foreign groups; No minimum; Maximum 100; need 2-3 months advance notice, especially during summer and weekends; tours narrated; translating in Spanish; touring hours 10-12 and 2-4 except Mondays; Also no a.m. trip Sundays; tours are conducted by excursion aboard Sam Houston boat; Boat in drydock in September; Visitors may view the Port Turning Basin from an Observation Deck at Gate 8, Clinton Dr.—no arrangement necessary.
Tour classification:
Regular by arrangement only.

Museums

RAILROAD MUSEUM
Texas Avenue at Crawford
Track 10 at Union Station
Houston, Texas

Description:
Study of railway transportation specifications. Visitors welcome. Admission is $.25. Museum is open on Sundays between 1 and 5 p.m.

WAX MUSEUM OF CLASSIC AUTOMOBILES
3009 South Post Oak Rd.
Houston, Texas

Description:
Display of classic automobiles. Museum opens at 10:00 and closes at 5:00. Admission is $1.00 each of students in a group of 10 or more; otherwise price is $1.50. Phone 621-2281.

TRANSPORTATION RESOURCE ASSISTANCE

Speakers

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Manager Flight Safety Inc.
William Hobby Airport
8249 Travelair St., Houston 77017

Mr. W. R. George 227-1429
West Gulf Maritime Association
Vice President and General Manager—4th Floor
Cotton Exchange Bldg.
Houston, Texas 77002

Mrs. Marge Kelly 644-3471
Texas International
P. O. Box 12788
Houston, Texas 77017
(Write for a speaker)

Mr. Phillip Joannes 626-0750
Senior Sales Representative—Eastern Airlines

Mrs. Ann Johnson 224-5047
Eastern Airlines

Mr. "Doc" Taylor 222-1231
Pan Am Airways

Mr. Jack W. Moore 453-7261
Todd Shipyards
Industrial Road
Houston, Texas

TRANSPORTATION
Media

FILM	*NUMBER*	*TIME*
The Air Traffic Controller with Teacher's Guide	5389	9 min.
The Airline Stewardess Typical activities of a Pan American Airways Stewardess	M-5417	12 min.
Autos and All that Traffic CBS Film Released by McGraw-Hill Book Co. Discusses traffic problems, air pollution, new cars to be developed, prevention of accidents, and highway planning	L-5419	25 min.
Boat Families (non narrative) Sterling Educational Film	M-5304	14 min.
The Mississippi System Waterway of Commerce ADM Films, Inc.	M-5238	16 min.
Panama Canal: Funnel for Commerce Charles Cahill and Associates, Inc.	M-5364	15 min.
Apollo 10 Shows Astronauts Stafford, Young and Cernan solving lunar landing problems National Aeronautics and Space Adm.	L-4685	25 min.
Screen News Digest Vol. 12, issue 7 *Jumbo Jet: A History of Aviation* Presented by the Houston Chronicle	M-4413	14 min.
Atlantic Crossing—Life on an Ocean Liner Follows exploration of three boys in passage from New York to Genoa Shows methods of operating an ocean liner	L-4441	21 min.
Freeway Driving is Different Special techniques in driving	M-4989	15 min.
Freewayphobia—Part I *Part II* Walt Disney Productions on highways	M-4793 M-4794	15 min. 15 min.

Rail Photography and music without narration. Conveys excitement of rail travel	M-4739	13 min.
**Screen News Digest, Vol. 13 Issue 9: *The Automobile in America, A Time of Challenge* (Growth and impact of automobile industry)	M-5009	15 min.
Flight of Apollo 15 (Man's journey to the moon)	M-5155	15 min.
Snow A documentary about trains and snow; contrast of workers and passengers	4738	10 min.
Transportation: A Ship Comes Home Complexity of modern transportation	M-5059	16 min.
A Long Way From Kitty Hawk—Careers in Aerospace By Miller Productions Inc. (in O. O. office) (medium length film		
Auto Mechanic and Technical Careers	L-3939	
**Flight Engineers/Stewardess* Cassette—Creative Visuals Box 1911-0-9 Big Spring, Texas 79720		

*Not available in Audiovisual Center for the Houston Independent School District.
**May also be suitable for Manufacturing Unit.

Bibliography

By Mrs. Mary Belt—Fondren Jr. High

E=Excellent
G=Good

Evaluation	*Pamphlets*	*Source*
G	"Automotive Careers at Ford"	Ford Ed. Affairs Dept. Dearborn, Michigan
E	"Truck and Bus Mechanics"	O. O. Handbook Reprint
E	"Driving Occupations"	(Same as above)
E	"Is There a Job for You In the Trucking Industry?"	Am. Trucking Association 1616 P. St., N. W. Washington, D. C. 20036
G	"Opportunities in the Trucking Industry"	(Same as above)
G	"On the Road with the Truckers"	(Same as above)
G	"Automobile Salesman"	Ford Educational Affairs Dept. Dearborn, Mich.

Books Available in Library

Your Future in the Auto Industry	D. Taylor R. Rosen, 1963
Airplane Stewardess—A Picture Story	J. Engeman Lathrop, 1960

To help teachers and students achieve a better understanding of the trucking industry, the American Trucking Associations has developed the publications listed on the following pages. We hope you will find this information of value in formulating your curricula on transportation and related areas of study.

Guided by the experience of teachers who have used our materials, we have listed the grade level for which each publication is generally considered best suited. This, however, should be regarded merely as a guide.

All of the publications listed are available without cost. They may be obtained by simply filling out and mailing the attached postage paid order blank. Your material will be sent to you promptly.

Educational Services
Public Relations Department
AMERICAN TRUCKING ASSOCIATIONS, INC.
1616 P Street, Northwest
Washington, D.C. 20036

TEACHING AIDS ORDER FORM

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American Trucking Trends	
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Serving the Community	
Skeins of Shoestrings	
Truck Drivers' Dictionary	
Truck Photos for Schools	
Truck Route to the Future	
Trucks and Things	
Wheels for America's Progress	

VOCATIONAL PUBLICATIONS	
Directory of Transportation Education	
Employment Outlook in Driving Occupations	
Is Your Future in the Trucking Industry?	
Occupational Outlook for Truck & Bus Mechanics	
Truck Driver Poster	
Scholarship Programs	

PLEASE SEND MATERIAL TO: (type or print)

name _____

school _____

address _____

city _____ state _____ ZIP _____

grade(s) _____

Directory of Transportation Education in U. S. Colleges and Universities A listing of the courses and degrees in transportation, traffic management, highway engineering and related subjects offered by hundreds of institutions.* 4 pages. Recommended for high school and college students.

Is Your Future in the Trucking Industry? Wall chart illustrating types of occupations in trucking. Includes background material on the role of trucking in the nation's economy, defense, farming, etc. Recommended for grades 5-12. One per classroom.

Opportunities in the Trucking Industry A discussion of career possibilities in the trucking industry. Contains a description of positions and information on how a trucking company operates. 8 pages. Recommended for grades 9-12. Classroom quantity.

Employment Outlook in Driving Occupations An ATA reprint of a U. S. Department of Labor publication with career information on commercial vehicle driving occupations.* 12 pages. Recommended for high school students.

Occupational Outlook for Truck and Bus Mechanics An ATA reprint of a U. S. Department of Labor publication with career information on truck and bus mechanics. 4 pages. Recommended for high school students.

Scholarship Programs of Motor Carrier Companies and Associations A listing of known aid-to-education programs of trucking companies and trucking associations. Includes information on eligibility, value, source and other valuable data. 10 pages. Recommended for high school students.*

The Truck Driver A colorful 13" x 15½" poster describing the job of professional truck drivers. Lists physical and training standards, and basic duties. Recommended for lower elementary grades. One per classroom.

motion picture

"Tommy Looks at Careers — Trucking" Tommy, a high school student participating in a "Career Fair," discovers the wide range of careers in trucking. Color, 16mm, 25 minutes.

CLASSROOM PUBLICATIONS

American Trucking Trends An annual report containing statistics and illustrations of trends in all important areas of the trucking industry. Includes data on industry size, equipment, wages, etc. 36 pages. One per teacher.

Cackle Crates, Bean Haulers and Six-Banger Semis This story of trucking, spiced with colorful truck drivers' jargon, emphasizes this industry's importance to the economy and tells how it utilizes the latest developments in design to serve present and future freight hauling needs. 6 pages. Recommended for grades 9-12. Classroom quantity.

Economic Giant A small fold-out, illustrated with cartoons, showing the magnitude and variety of materials used in the manufacture and operation of trucks. Recommended for grades 5-12. Classroom quantity.

Economics Unit Outline A complete outline for teacher use in introducing basic economic concepts. Prepared by a noted educator. 12 pages. Recommended for grades 4-9. One per teacher.

Highball Ahead This article tells why trucking, America's number one hauler of freight, is an indispensable part of our economy. 6 pages. Recommended for grades 9-12. Classroom quantity.

How Trucks Serve You A pamphlet describing the retail market's dependence upon truck transport, and listing some of the commodities hauled by truck. 6 pages. Recommended for grades 7-12. Classroom quantity.

If You've Got It, A Truck Brought It An illustrated pamphlet describing how milk is transported from farm to front door. 6 pages. May be used with lower elementary students as well as grades 6 and 7. Classroom quantity.

On the Road with the Truckers This article, by a writer who goes on a run with two truck drivers, tells what it's like to be an over-the-road driver. 6 pages. Recommended for grades 9-12. Classroom quantity.

Practical Driving Tips A collection of driving tips for motorists in special driving conditions, such as heavy traffic and freeways, and various weather and seasonal conditions. 24 pages. Recommended for use in driver education classes. Classroom quantity.

Serving the Community An article which describes how a modern trucking company operates to serve the public. Includes several photos. 4 pages. Recommended for grades 5-12. Classroom quantity.

Skeins of Shoestrings A brief history of the beginnings of the trucking industry, such as equipment used and the founding of some of the large companies of today. 9 pages. Recommended for grades 9-12. Classroom quantity.

Truck Drivers' Dictionary and Glossary of Trucking Terms A booklet defining some of the special and often amusing terms used in the trucking industry. It also contains a special glossary of technical terms. 36 pages. Recommended for all grades.

Truck Photos for Schools A kit of truck pictures, showing various types of trucks in use. Size 8½ x 11, black and white, suitable for framing or bulletin board display. Recommended for all grade levels. One set to a classroom.

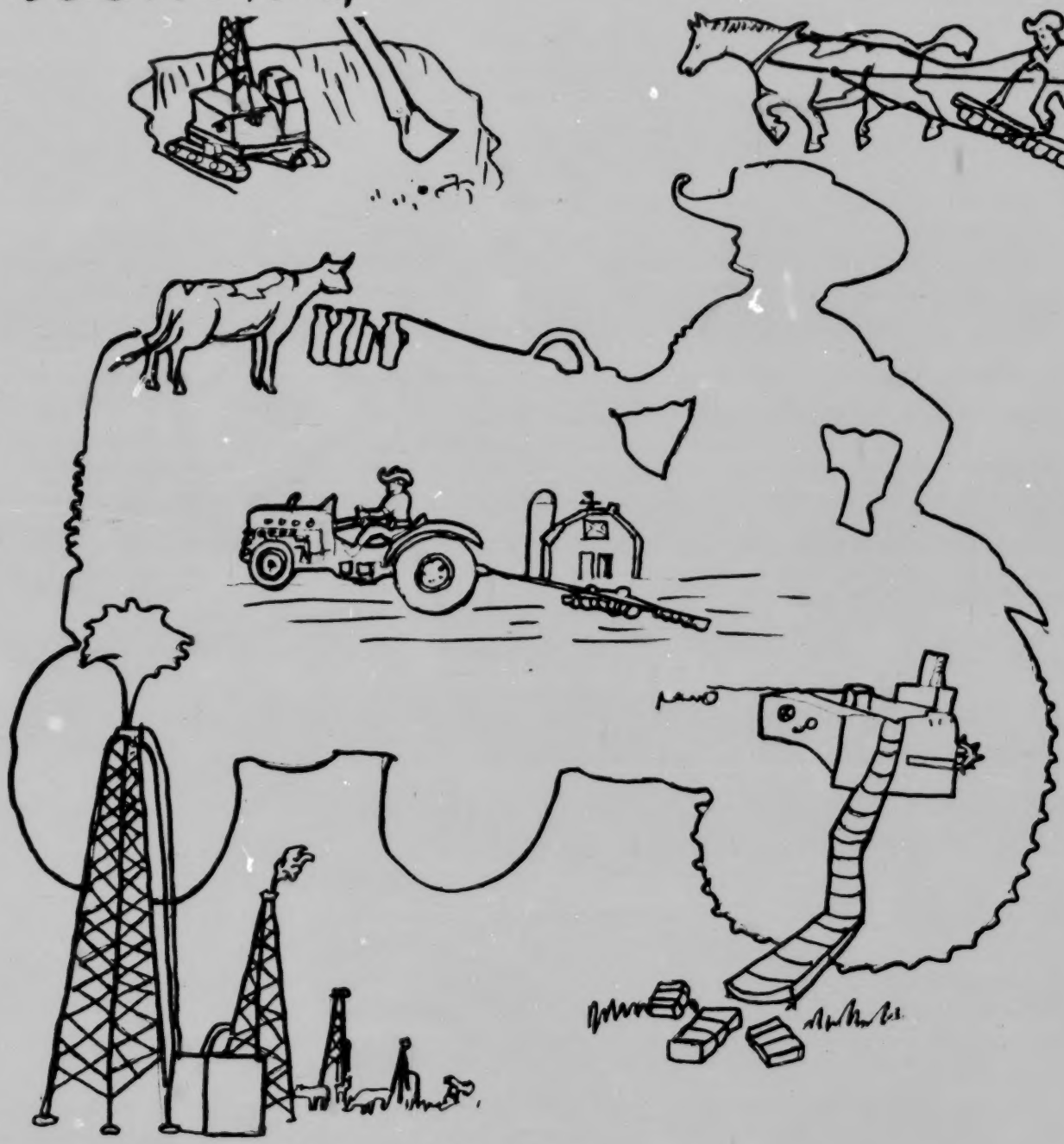
Truck Route to the Future This article tells what's around the corner for the trucking industry . . . greater payloads, more power, containerization, and a new breed of truck drivers. 4 pages. Recommended for grades 9-12. Classroom quantity.

Wheels for America's Progress This reprint from *Grade Teacher* magazine discusses the impact of the trucking industry on the American economy. This complete course guide includes suggested classroom and student activities. 8 pages. Recommended for grades 1-7. One per teacher.

CAREER INFORMATION FOR YOUR FIELDS OF INTEREST

Get recent books and magazines from public or school library.
Go to see the State Employment Offices.
Visit places of work.
Know your Social Security Number and Laws of U. S. Department of Labor.
Practice writing letters of application. Keep your resume up to date.
Do volunteer work.
Keep up with changes in the working world.
Attend classes in careers and related subjects.
Interview friends, relatives, neighbors, civic, and business leaders.
Clip newspaper articles and want ads
Make your own visual aids. See films on careers.
Join clubs. Find hobbies and crafts that tie in with your interests.
Send for government bulletins and information from schools and business leaders.

SECTION G



AGRI-BUSINESS & NATURAL RESOURCES OCCUPATIONS

CLASSROOM PRESENTATION OF CONCEPTS AND PROCEDURES OF AGRI-BUSINESS AND NATURAL RESOURCES OCCUPATIONS

I. Behavioral Objectives

A. Eighty percent of students will associate the food they eat with the work of men and women in agricultural careers.

B. Sixty percent of students will plant a seed or transplant a young plant. They will record the activities required in caring for the plant and predict appearance and use of the mature plant.

C. Ninety percent of the academically able students will research the current oil shortage crisis and evaluate attempted solutions.

D. Eighty percent of the students will identify their interests with career materials supplied by the county agricultural agent.

E. Sixty percent of students will list government agencies that assist agri-business and/or natural resources careers.

II. Instructional Procedures

A. Introduction to basic needs of man and duties of the workers who supply these needs

B. Assignment of the following student activities based on interest and abilities of each individual.

Student Activities

Students will complete two or more of the following activities:

1. List the foods you ate yesterday. Name the agricultural workers who made your food possible.
2. Take notes on the class speakers in agri-business and/or natural resources. Write thank-you letters to the speakers or the people who made your study tour possible.
3. Collect pictures of workers in agri-business and/or natural resources.
4. Plant a seed or transplant a young plant. Watch it grow. Bring the plant to class when it is two weeks old. Tell the class the steps you took in caring for the plant. Predict size, color, and time needed for the plant to become fully grown.
5. Write an oil company, a forest ranger, or other workers in this career field. Ask for information on jobs that interest you.
6. List government and private agencies that assist workers in agriculture and/or natural resources. Write the duties of these agencies.
7. Collect three or more current events on agriculture.
8. Collect three or more current articles on the oil industry.
9. Get information on the Hockley Mines at Waller, Texas. You may write United Salt Corp., 2000 West Loop South, Houston, Texas.
10. Write two pages about the Texas sulphur deposits. Use current reference books or write Texas Gulf Sulphur Co., Houston Club Bldg., Houston, Texas.
11. Analyze the oil shortage in the United States. Refer to recent newspapers and magazines. Try to show the cause and effects of our nation's attempts to solve this problem.
12. Make a poster on careers in agriculture.
13. Solve the energy crisis with the model of an invention that you can demonstrate in class.
14. Complete a short term project suggested by the Youth Director from the County Agricultural Agent's office.
15. Make a poster on careers in natural resources.
16. Interview a farmer, rancher, or dairyman. Take notes on the advantages and disadvantages of his work.
17. Interview an oil company employee. Take notes on the advantages and disadvantages of his work.
18. Make a small scale model of a refinery, an oil rig, a dairy, a rice mill, or a crop duster.
19. Visit a feed store. Take notes on duties of the workers.

20. Copy the addresses of five or more oil companies from the yellow pages of the telephone directory.

21. Name and give the use of five tools used in agri-business or natural resources.

22. List five by-products of oil. Tell the uses of each.

23. Interview a gas station attendant. List what he likes and what he dislikes about his job.

24. Make a terrarium.

25. Visit a state or national park. Ask a ranger what qualifications he needed for his work.

III. Performance Goals

A. Hobby results from short term project set up by County Agricultural Agent

B. Discussion of current trends in Agri-Business and/or Natural Resources

IV. Evaluation

A. Summation of activities as shown on the wheel

B. Completion of student activities assigned on first day

C. Oral and written communications in class

FLEXIBLE LESSON PLAN

First Day

Audiovisual introduction (Include a program for agriculture and one for petroleum. See Media Appendix.)

Distribute and assign student activities (Instructional Objectives).

If time permits, include discussion of experiences and interests of students. Have current events on display.

Second Day

Guest speaker or study tour (See Appendix.)

Third Day

Guest speaker from an oil company (See Appendix.)

Fourth Day

Student presentations of assignments

If time permits, set up an improvisational skit on the occupations.

Example: A rice farmer is ready to harvest his crop. He needs part-time help. Assign a student to act as the farmer, who explains the work to the applicants. After the interviews, have him tell the class which applicants he picked and why.

Example: A chemist for an oil company explains the work in his lab to a group of students who want summer work. After interviewing the students, have the chemist explain why he chose the ones he did.

APPENDIX

1. Interdependence Chart
2. H.E.W. Chart
3. Stories, Data, Activities*
4. Want Ads
5. Predictions
6. Resources
   a. Study tours
   b. Speakers
   c. Media
   d. Printed Materials
7. Summation Wheel

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*This may vary with specific subjects in the different careers

NATURAL RESOURCES – Interdependence – Examples of a Few People and Places

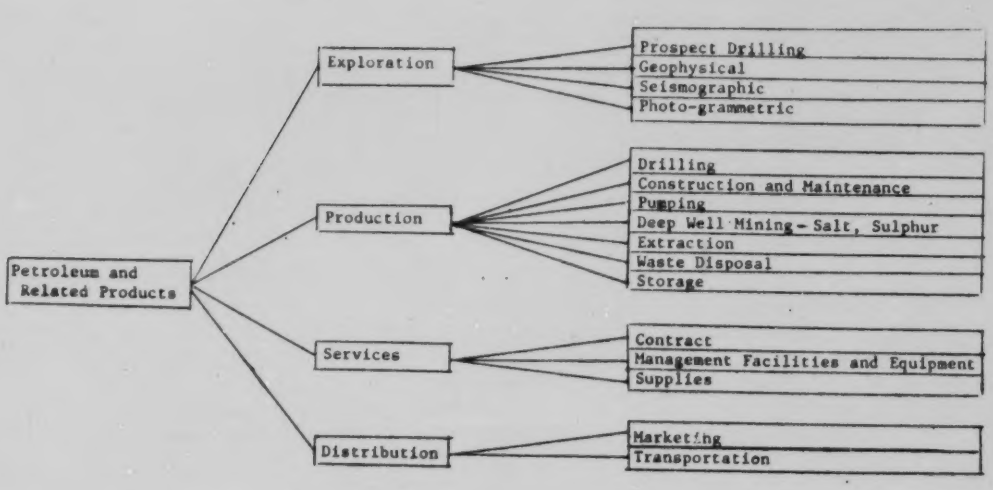
Needs	Careers	Location
Oil – Why? Nation's Energy	Geologists Chemists Engineers Rough Necks Mud Logging Technicians Drilling Superintendents Divers Oil Land Leasers Pipe Fitters Welders Brokers Advertising Agents Safety Engineers Wholesale Distributors Retail Distributors Service Station Attentant	Oil Company Offices Refineries Oil Company Laboratories Filling Stations Exploration Corporations
By-Products – Why? Industrial Chemicals	Chemists Engineers Technicians Assembly Line Worker Packing Clerks Salesmen Clerks Purchasing Agents	Refineries Oil Offices Chemical Laboratories Consultant Offices Chemical Wholesale Houses
Equipment, Service, and Supplies – Why? Tools to Locate and Produce Oil	Engineers Technicians Manufacturers Inspectors Salesmen Truckers Assistant Deliverymen Clerks	Oil Field Service Companies Oil Field Specialities Companies Oil Field Repair Companies Oil Field Equipment Renting Companies Oil Field Hauling Companies Oil Field Pumping Equipment Companie Derrick Companies Power Generator Companies

AGRI-BUSINESS — Interdependence — Examples of a Few People and Places

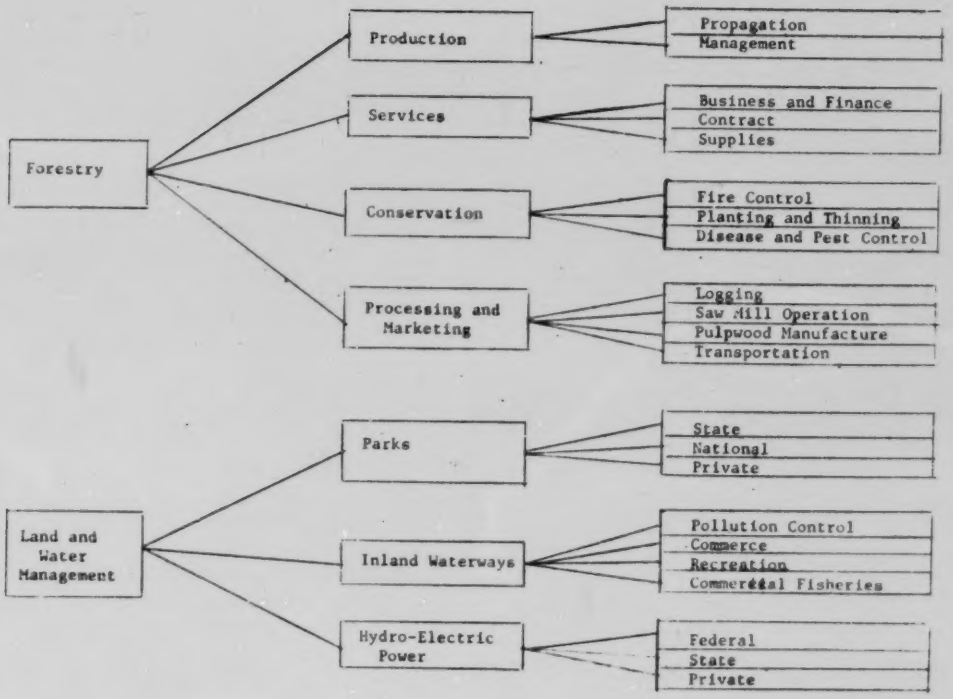
Needs	Careers	Location
Agencies and Organizations Why? Represent Farmers and Ranchers	County Agents — 4-H Directors Future Farmers of America Directors Writers — Lobbyists — Clerks Home Demonstration Leaders Forest Rangers Soil Engineers	Government Offices Agricultural Colleges Banks (near rural areas) Farms — Dairies Ranches
Cattle and Swine — Why? Food and Leather	Cowboys — Cattle Buyers Ranch Owners Dairy Helpers Cattle Auctioneers Packing House Administrators Meat Cutters — Meat Inspectors	Ranches Dairies Packing Houses Wholesale, meat Distribution
Grain, Cotton, Forest, Fruits, and Vegetables Why? Food, Clothes, Home	Rice Farmers Lumber Jacks Cotton Gin Operators Grain Elevator Operators Fruit or Vegetable Farmers Cannery Workers Rice Millers	Farms Rice Mills Cotton Gins Lumber Mills Grain Elevators Can Plants
Supplies and Equipment Why? Improve Crops and Livestock	Crop Dusting Pilots Feed Store Owners Seed Store Operators Tractor Distributors Hardware Store Clerks Insecticide Chemists	Crop Dusting Companies Feed Stores Tractor Companies Hardware Stores Agricultural Laboratories

AGRI-BUSINESS AND NATURAL RESOURCES

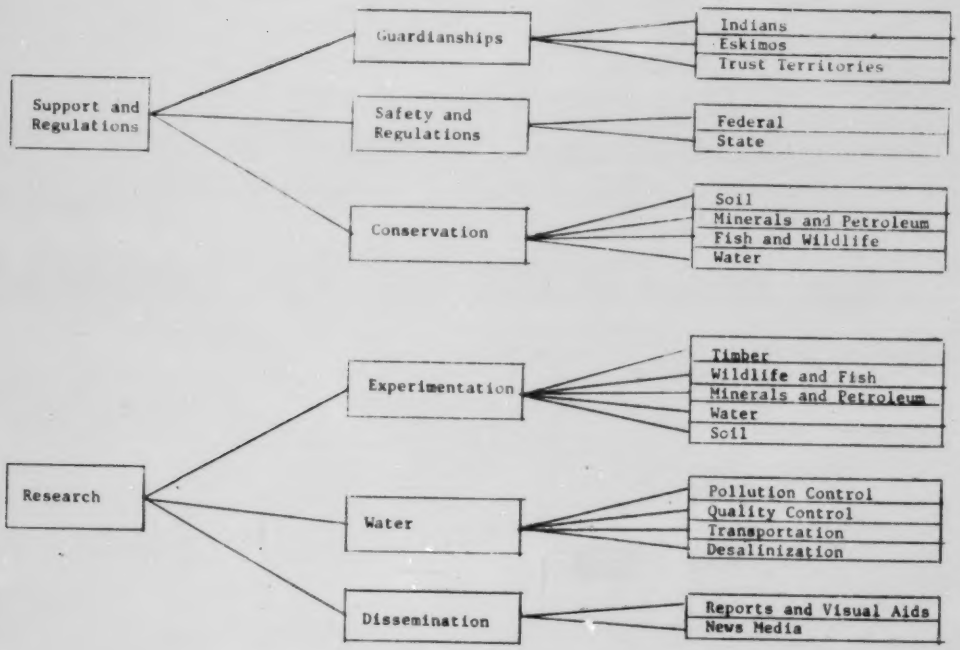
Petroleum and Related Products



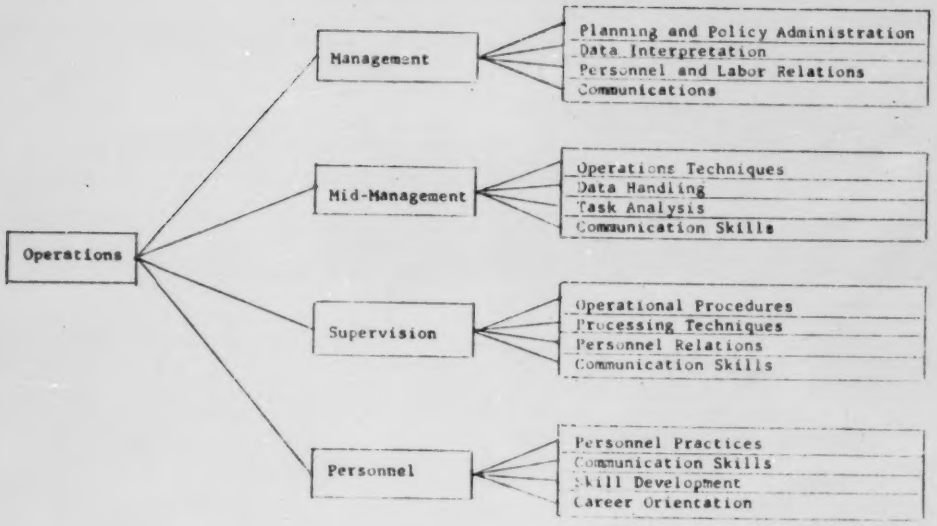
Forestry and Land and Water Management



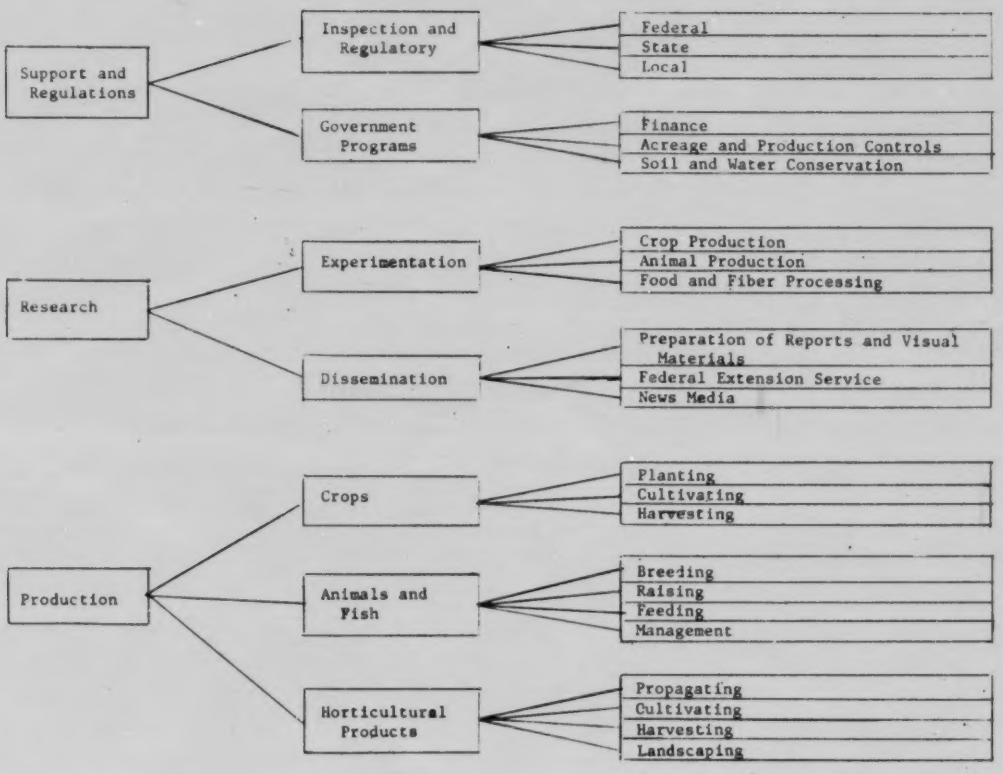
Support and Regulations and Research



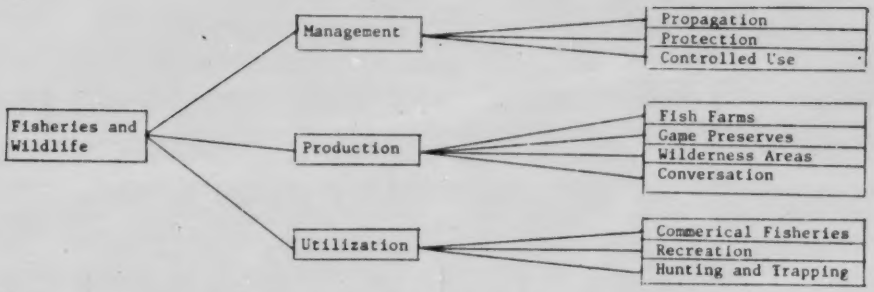
Operations



Support and Regulations
Research
Production

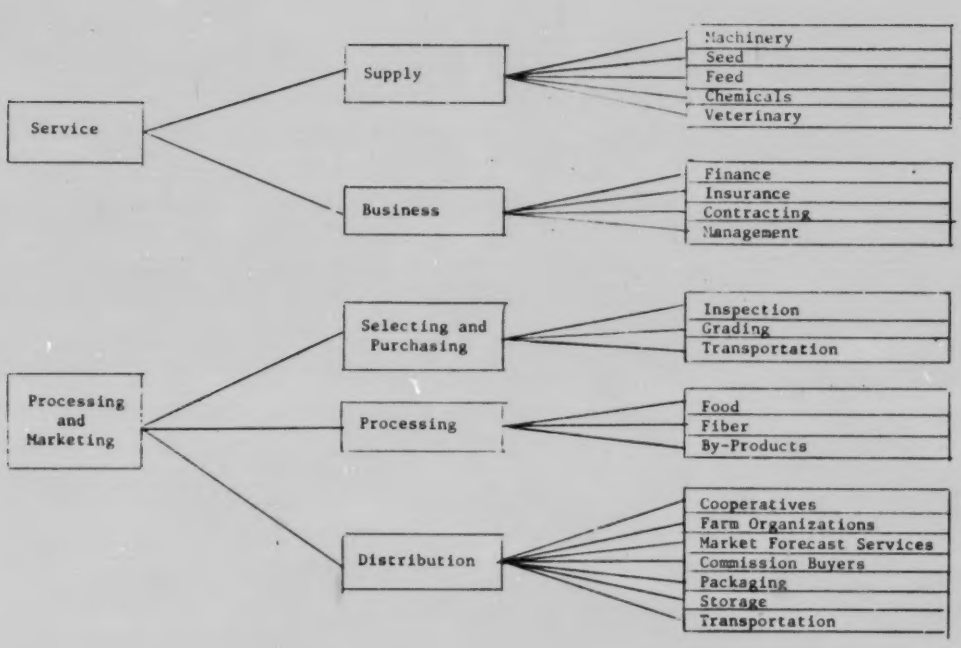


Fisheries and Wildlife

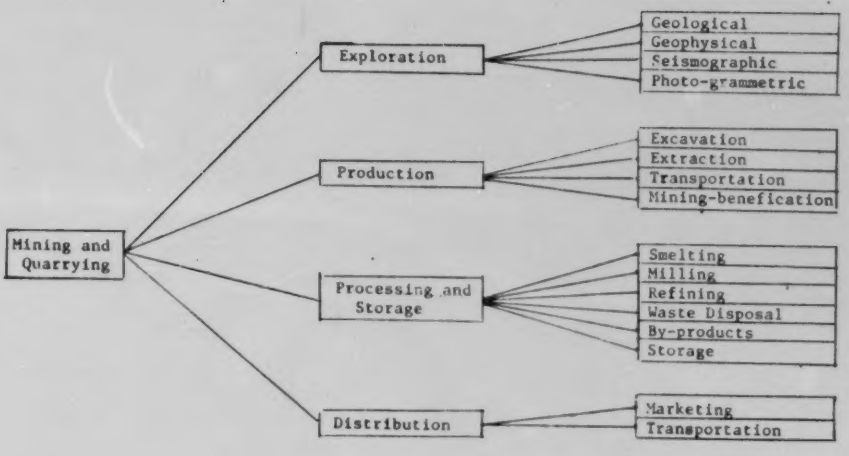


Service

Processing and Marketing



Mining and Quarrying



AGRICULTURAL ORGANIZATIONS

There are government agencies to help with the production of crops. These agencies are federal, state, and county. Some organizations are self-sustaining. To be self-sustaining means the organization is able to take in enough money from their own activities to cover expenses. The government does not help self-sustaining organizations.

Some of the government agencies are—

1. *Agricultural Stabilization Conservation Service*
   The old name was Triple A. It started in the late 30's under Franklin D. Roosevelt. The new name for the agency is REAP. Its purpose is to stabilize prices and conserve resources.

2. *Texas Agricultural Extension Service.*
   Its purpose is to extend education. Career information in all areas of work is included. Free materials, lectures, films, demonstrations, and awards are presented by the County Agent and his assistants. No subject is too difficult and no location is too remote for help to be given when it is requested.

3. *Farmers' Home Administration*
   This is a leading agency of the federal government. Money is loaned for farms and farm-related activities.

4. *Production Credit Administration*
   This organization is self-sustaining. Credit is extended when need and production are shown.

5. *Vocational Agriculture*
   The purpose of this department is to encourage and give instructions by "hands-on" experiences in agriculture. The Future Farmers of America is an example of the organizations in Vocational Agriculture. The money in this department is distributed under the Smith-Hughes Act (a vocational act that sets up funds from the federal government to be matched by taxes from the state).

Why is the government concerned with helping people in agri-business careers? The government support is an answer to weather and insects that can wipe out the crop which is the farmer's only income. Many people turn away to seek more stable jobs in a city. This turning away has brought a need for more dependable earnings on the farm. For the good of all mankind, it is necessary to produce ample food; therefore, the need of money and the need of food have brought together taxes and money lenders who want to keep our nation well fed and our farmers well paid.

If a farmer needs to borrow money, he must put up security. This means his property or other goods will be given up if he fails to repay money in a fair length of time. The interest rate is reasonable and the committee members who have been elected decide on loans to be given only in his own community. Neighbors serve on the committees without pay for a short length of time as set up by their rules and regulations. When the committeemen are elected to serve as reviewers of credit applications, they must be willing to give time for meetings (perhaps once or twice a month), and they must be ineligible for loans. This means they are doing well and do not need to borrow money for themselves.

In addition to government agencies, banks also loan money to farmers. These banks are usually located in or near the agricultural areas. In the Greater Houston area, banks that assist farmers are located at Humble, Tomball, Spring, Almeda, and outlying areas.

Since Houston sometimes has threats of hurricanes, farmers in this area are given an opportunity to buy insurance which will cover some of their losses. These policies are obtained through the Federation Insurance Corporation.

Farmers, just as those in most other careers, can improve their working conditions by organizing. Hard work on the part of each individual, as well as planned teamwork, is the key to success. The plans set up by organizations help farmers get more opportunities to sell and to obtain better prices for their products. Our government is of the people, by the people, and for the people, but to make voices heard, sometimes the people must pool their efforts and send representatives who will express their views to Congressmen. This method of paying people to repeat wishes of organized workers is called *lobbying*. Lobbying has a strong effect on the bills that become the laws in the United Sates. There are several agricultural organizations to assist farmers and ranchers. Some of them are National Farm Organization, Farm Bureau, Cattlemen's Association, the Rice Council, and the National Dairy Association.

As agri-business turns more and more toward the world market, the farmers will need more communication on price changes that will result from new supplies and demands. When more countries become a part of buying and selling products, our own government will change the subsidies given to farmers. A subsidy is a government gift of money to aid or encourage a private enterprise that serves the public. Present agricultural subsidies in the United States are on cotton, feed grain, peanuts, wheat, rice, tobacco, and sugar cane. The farmer must agree to produce a crop on a given number of acres, for if he exceeds the number of acres, a hunger crop would result. When lots of crops are for sale on a free market, the price goes down; so the government is trying to protect the farmer by setting regulations and giving him extra cash.

*NATION'S RICHEST RESOURCES

The value of Texas minerals reached a new high in 1970. Totaling $6.3 billion, it surpassed the 1969 record of $5.8 billion, and 1968's $5.5 billion. Minerals were produced in 235 of the state's 254 counties.

Although Texas' national leadership in mineral production is largely due to the production of oil and natural gas, the state also ranks high in quantity, variety and value of other important minerals. It produces 47% of the nation's natural gas and leads the country in many other raw materials, agricultural products, organic and inorganic chemicals.

Texas ranks first in the production of oil, natural gas, cattle, grain sorghums, mohair, wool, cotton and rice. It is a major processor of cottonseed, linseed, peanut and sesame oil seeds, grain, sugar, produce, cattle, sheep and goats. It also produces 70% of the U. S. supply of carbon black, 80% of the world's supply of sulphur, 16% of the U. S. production capacity of zinc, and 14% of the U. S. refining capacity of copper. Thirty-five kinds of minerals, representing 25% of the total U. S. mineral supply, are produced commercially. Steel production is increasing rapidly, and aluminum production is approaching one-fourth of the nation's supply. The state is the sole source of magnesium ingot and is the home of the world's largest salt dome and helium plant.

*WATER

Texas contains 3695 square miles of impounded fresh water area including nine principal rivers measuring 6765 miles, and vast underground water resources. Total water use for all purposes is 30 million acre-feet annually. About half is used for irrigation, municipal and industrial purposes, and the remainder for power generation, recreation, and industrial processes which return water to downstream users. In October, 1969, 157 major reservoirs of 5,000 acre-feet or more were existing or under construction. Current storage capacity of all Texas reservoirs is 37 million acre-feet, and plans for development promise to keep supply ahead of demand until the turn of the century.

*From *Texas Plant Location Fact Book*, published by the State of Texas.

MINERAL PRODUCTION IN TEXAS

(Production measured by mine shipments, sales or marketable production, including consumption by producer)

MINERAL —	1969 Production	1969 Value (add 000)	*1970 Production	*1970 Value (add 000)
Cement:				
Portland, thousand 376-lb. bbls.	36,037	$ 117,989	35,892	$ 107,370
Masonry, thousand 280-lb. bbls.	1,110	3,873	955	3,331
Clays, thousand short tons	4,407	8,664	3,976	7,759
Gemstones	†	150	†	150
Gypsum, thousand short tons	1,314	4,398	1,619	4,599
Helium:				
Refined, thousand cu. ft.	140,500	4,917	84,000	2,940
Crude, thousand cu. ft.	1,190,300	13,053	1,217,200	13,727
Lime, thousand short tons	1,633	22,107	1,650	22,320
Natural gas, million cu. ft.	7,853,199	1,075,888	8,508,982	1,242,311
Natural gas liquids:				
Natural gasoline and cycle products, thousand 42-gal. bbls.	96,628	289,042	97,420	293,234
LP gases, thousand 42-gal. bbls.	194,599	237,411	201,990	315,104
Petroleum (crude), thousand 42-gal. bbls.	1,151,775	3,696,328	1,231,900	4,065,270
Salt, thousand short tons	9,261	43,012	10,269	47,620
Sand and gravel, thousand short tons	29,972	39,756	29,073	38,667
Stone, thousand short tons	46,638	64,986	46,800	64,500
Sulphur (Frasch process) thousand long tons	2,552	68,360	2,956	53,208
Talc and soapstone, short tons	163,812	668	139,000	635
‡Undistributed	—	79,368	—	59,016
Total Texas Values	—	$5,769,970	—	$6,341,761

* Preliminary.

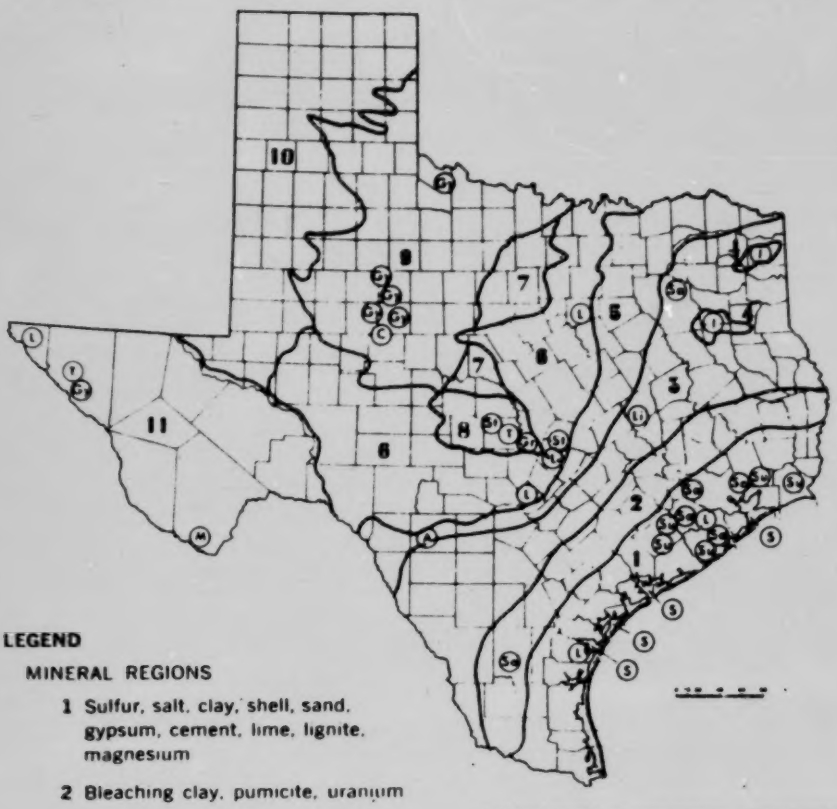
† Weight not recorded.

‡ Includes asphalt, bromine, coal (lignite), graphite, iron ore (usable), magnesium chloride (for metal), magnesium compounds (except for metal), mercury, pumicite, sodium sulphate, uranium ore and vermiculite.

Source: Texas Almanac, 1972-73.

From *Texas Plant Location Fact Book* published by the State of Texas

MINERAL REGIONS AND IMPORTANT PRODUCING LOCALITIES



LEGEND

MINERAL REGIONS

1 Sulfur, salt, clay, shell, sand, gypsum, cement, lime, lignite, magnesium

2 Bleaching clay, pumicite, uranium

3 Clay, lignite, industrial sand, salt, uranium

4 Iron ore

5 Clay, asphalt, cement, coal

6 Limestone, dolomite, clay, gypsum, silica sand, sulfur, sodium sulfate

7 Clay, limestone

8 Granite, graphite, soapstone, limestone, dolomite, iron ore, vermiculite, sand

9 gypsum, clay, limestone, salt, cement, magnesium, sodium sulfate

10 Sand, gravel, salt, clay

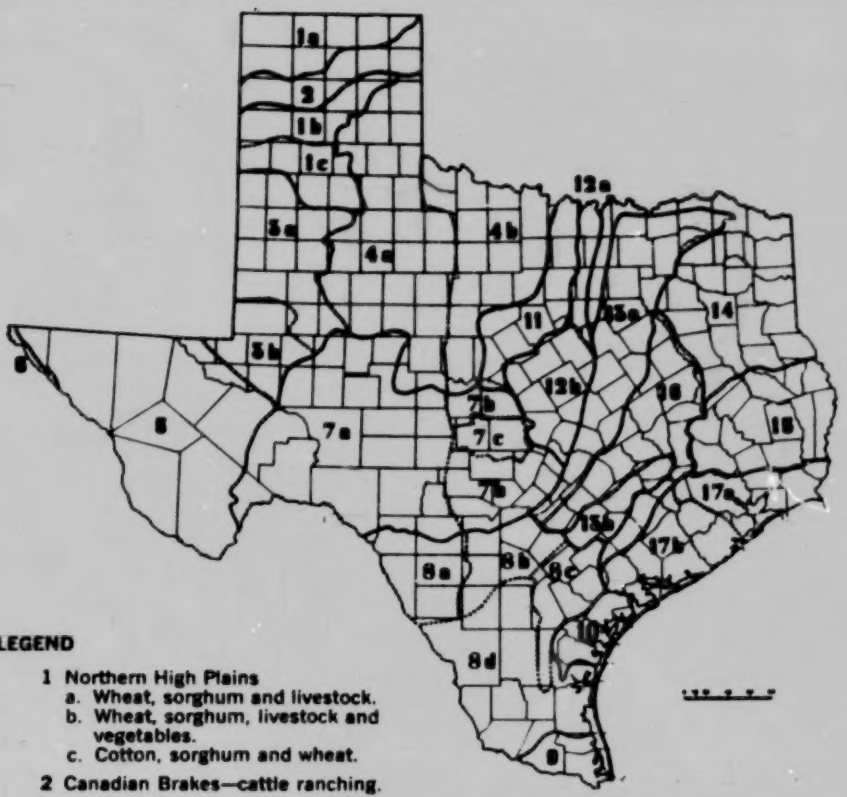
11 Zinc, mercury, gypsum, limestone, talc, barite, fluorite

IMPORTANT PRODUCING LOCALITIES

(A) Asphalt
(Gr) Graphite
(Gy) Gypsum
(I) Iron
(L) Lime
(Li) Lignite
(M) Mercury
(S) Shell
(Sa) Salt
(St) Stone
(Su) Sulfur
(T) Talc-Soapstone

From *Texas Plant Location Fact Book* published by the State of Texas

AGRICULTURAL REGIONS



LEGEND

1 Northern High Plains
- a. Wheat, sorghum and livestock.
- b. Wheat, sorghum, livestock and vegetables.
- c. Cotton, sorghum and wheat.

2 Canadian Brakes—cattle ranching.

3 Southern High Plains
- a. Farming—cotton and grain sorghum.
- b. Ranching—mainly cattle.

4 Rolling Plains and Prairies
- a. Cotton, grain sorghum, wheat and livestock.
- b. Small grains and livestock.

5 Mountains and Basins—cotton and ranching.

6 Upper Rio Grande Valley—cotton, alfalfa and dairy products.

7 Edwards Plateau and Central Basin
- a. Large ranches—cattle, sheep and goats.
- b. Small ranches—cattle, sheep and goats.
- c. Central Basin—cattle.

8 South Texas Plain
- a. Vegetables and cattle.
- b. Livestock, peanuts and truck crops.
- c. Cotton, flax and livestock
- d. Livestock and cotton.

9 Lower Rio Grande Valley—cotton, vegetables and citrus.

10 Coastal Bend—cotton, grain sorghum and vegetables.

11 West Cross Timbers—peanuts, dairy products and livestock.

12 Grand Prairie
- a. Small grains, cotton, dairy products and livestock.
- b. Livestock, small grains and cotton.

13 Blackland
- a. Cotton and livestock.
- b. Poultry, dairy products, cattle and cotton.

14 East Texas Farming—livestock, poultry, dairy products and cotton.

15 East Texas Timber—timber products, poultry and livestock.

16 Post Oak—cotton and livestock.

17 Coast Prairie
- a. Rice, cattle and dairy products
- b. Cotton, rice and cattle.

From *Texas Plant Location Fact Book* published by the State of Texas

New York Times Photo

SIGN SAYS THAT FARM IS PARTICIPATING IN GOVERNMENT PROGRAM
Farmer Is Subsidized for Allowing Sportsmen to Hunt

Opening Farms for Recreation Profiting Farmers and Visitors

BY SETH S. KING

©1972, New York Times News Service

Stroud, Okla. — Claud Earp squatted happily on the damp, manure-splotched bank of his farm pond, watching Mrs. Thelma Newnam and her married daughter pull little bluegills from the murky water.

"Fishermen know that some of the best fishing you're going to get in Oklahoma is in farm ponds," Earp explained. "So we're getting somebody out here almost every day. Most of 'em, like those ladies there, do real good, too."

Earp is one of more than 160 Oklahoma farmers who, in return for an Agriculture Department payment, are opening their land, with few restrictions and no charges, to fishermen, hunters or townspeople who might want to hike around their farms.

Its is part of a pilot program to test the feasibility of paying farmers to allow anyone who wishes to escape from his community for a few hours' free access to the countryside.

Since early spring, when the program began, scores of these recreational farms in 50 counties in Colorado, Indiana, Iowa, Louisiana, Michigan, North Dakota, Oklahoma, Oregon, Pennsylvania and South Carolina have opened their gates.

and overnight camping if he chooses.

The annual fee paid to the farmer is set by local agriculture officals and is based on the estimated value of the recreational possibilities on the farm and how much land, when hunting is permitted, is available to hunters. Payments may range from as low as $100 to more than $1000 a farm.

Charles W. Smith, whose farm is within a few miles drive of Indianapolis, has been paid $150 for permitting people to fish in his three-acre pond and $150 more to allow squirrel and quail hunters to shoot on his property this fall.

Since fishing weather became good at the beginning of the summer, more than 1300 fishermen have tried the Smith pond. Many of them came from Indianapolis. Some came from as far away as Michigan, California and Arizona.

"They sure don't bother anything and most of 'em clean up pretty good afterward," Smith said.

Earp of Oklahoma, who says he has been told that he is a distant relative of the legendary Wyatt Earp, the Dodge City deputy, said he had not bothered to restrict visitors in any way.

Five of his man-made farm ponds, well-stocked with fish donated by the state wildlife department, are open to fishermen, and hunters can roam over 700 acres of his pastureland in search of dove, quail and, later in the year, deer.

The Agriculture Department has set aside $1.5 million to finance the program this year. It is expected to be continued, still on an experimental basis, next year. If it is judged a success, the department may ask Congress to provide funds to expand the program throughout the nation.

Opening his property to the public is about the only action a participating farmer has to take, besides posting signs along his fences. These signs, supplied by the local Agricultural Stabilization and Conservation Service, state that hunting or fishing or both are permitted without charge on the farm. The signs include two lines of type reading "discrimination on the basis of race, color, or national origin is prohibited."

The farmer does not have to place any special improvements on his property. He may open all or part of his land to the visitors. He may also request them to stay away from his buildings and he may set rules on fires

The Houston Chronicle
September 17, 1972

CORN GROWERS TO GET AID ON CROP STORAGE

Washington (UPI) — The Agriculture Department plans to come to the aid of corn growers who want price support loans for their crop but can't find approved storage space.

Under a plan announced by officials here, such growers will be given support loans and their corn will be shipped out to terminal warehouses in other areas.

Assistant Agriculture Secretary Carroll G. Brunthaver said the special loan system will be available in areas officially designated as "storage short" by state and county agricultural stabilization committees.

Grain Dealers Got New-Policy Word

BY NICK KOTZ

©1972, Los Angeles Times-Washington Post News Service

Washington — An Agriculture Department official admitted that grain exporters selling wheat to Russia received advance information of a policy change. They could have used that information to make a profit at taxpayers' expense, another official testified.

Charles Pence, director of the grain division of USDA's Export Marketing Service, said he had telephoned grain exporters telling them that U.S. export subsidies would be lowered under a new USDA policy.

Carroll Brunthaver, assistant agriculture secretary for international affairs, told a House agriculture subcommittee that such advance information could have permitted a firm to make a quick deal and get a higher federal subsidy payment.

Both Brunthaver and Agriculture Secretary Earl Butz denied in testimony before the subcommittee that traders had advance warning of the Aug. 25 policy change.

Pence, however, said he had called the exporters on Brunthaver's orders, which were relayed to him by another USDA official, Frank McKnight.

Told of Pence's statement, Brunthaver at first said, "I know nothing about it," but later said; "I don't know. I will have to check my calendar."

Rep. Graham Purcell, D-Texas, chairman of the subcommittee, said he wanted Pence to testify next Monday. Brunthaver replied that Pence had been scheduled to leave for Japan Thursday. Later he said the trip would be canceled and Pence would appear.

The Pence controversy is the latest element in a growing controversy over who benefited from a $1 billion sale of U.S. wheat and other grains to the Soviet Union. The U.S.-Soviet agreement for credit terms was announced July 8, but since then it has gradually become known that the Sovi-

(See GRAIN, Page 20)

FROM PAGE 1

ets bought far more wheat than expected — a total of about 400 million bushels which is more than one-fourth of total U.S. consumption.

The essential controversy, raised by Purcell and other congressmen and by presidential candidate George McGovern, is whether USDA handled information in a way which benefited the exporters and hurt consumers, farmers, and domestic wheat users such as bakers.

Farmers in the Southwest complain they sold their wheat at low prices in July, not realizing that a huge trade was unfolding that would cause the price of wheat to soar in August.

In testifying before the committee Thursday, Butz insisted that the huge wheat purchase came as a surprise to USDA, the traders and even the Russians, and that no one benefitted from inside information.

Sales Endangered

Butz said the U.S. will benefit from the sale—the largest of its kind in history—in an improved U.S. balance of payments, tax savings on lower price supports for farmers, higher farmer income and better relations with the Soviet Union. He warned that future sales to the Soviets are endangered by the present controversy.

Purcell and other critics responded that they favored the huge sale, but are concerned that exporters had gotten unfair advantage, and that a cozy relationship existed in which officials moved back and forth between export firms and the Agriculture Department.

Pence's series of telephone calls to the traders is but one of a number of circumstances the subcommittee is investigating to see how USDA handled the grain sales.

Rep. John Melcher, D-Mont., asked whether any USDA officials, including Pence, had called exporters in advance of an Aug. 25 policy change on federal export subsidies. Butz and Brunthaver replied that no such calls were made, but Brunthaver acknowledged that advance information "could have benefited someone. They could have made a deal or a sale."

Domestic Prices

The subsidy is designed to help export U.S. wheat against foreign competition while at the same time maintaining prices for domestic wheat, thereby benefiting farmers. The export subsidy was only about 7 cents a bushel in early July, but rose to 38 cents by Aug. 25.

Pence said that on orders from McKnight and Brunthaver, he started telephoning the six export firms involved in the Soviet sale. Beginning before noon and finishing shortly after noon of Aug. 24, Pence said, he called officials of Continental Grain Co., Cargill Inc., Bunge Corp., Cook Industries, Louis-Dreyfus and Co., and Garneck Grain Co. Later, he said he called other exporters so everyone "would have the word."

Following instructions, Pence said, he told the exporters that USDA would no longer increase the export price to match domestic rises "and in any new sales they would have to take the risk on their own" (that they could buy wheat at a price to make a profit).

As matters turned out, Pence's information could have been very valuable to a trader.

At the least, a trader knew that he had better move fast to close sales on which he would be guaranteed a 38 cents per bushel subsidy. At best, traders who closed sales before 3:30 p.m. Aug. 24 got the special 47-cent subsidy.

USDA announced late on Aug. 25 that it no longer would raise the export subsidy to match rises in the domestic price. However, it gave exporters one week to sign up for even higher subsidies on any grain sales made before 3:30 p.m. Aug. 24. On these sales, USDA would pay 47 cents per bushel, which has 9 cents more than the peak reached on Aug. 25. USDA said this was justified because exporters had been led to believe the subsidies would continue to rise.

During the following one-week grace period, exporters registered more than 280 million bushels of wheat for the higher subsidy, at a total federal cost of $130 million.

The Houston Chronicle
September 15, 1972

WATCH FOR NEW CROPS, NEW PRODUCTS, AND NEW SERVICES. List the crops that soy beans are replacing .

Soybeans: Happy Jingle in Farmer's Pocket

BY SETH S. KING

©1972 New York Times News Service

Callender, Iowa — One of the new delights Garland C. Hanson has found this fall is a battery-powered calculator he can carry around in his pocket.

It gives him an instant reading on the dollars this year's soybean crop will yield and these readings are all coming up golden.

As he stood beside the round, corrugated storage bins in his wide yard, watching the golden streams of soybeans pouring from his farm wagons, Hanson calculated that the new wonder crop would add at least a third to his income in a harvest year that is as good in both yield and prices as he can remember.

The Department of Agriculture agrees. Its latest estimates, published Oct. 12, placed the 1972 American crop at 1.3 billion bushels, 13 percent higher than last year's record total. This is based on an average per-acre yield for the United States of 28.7 bushels, an increase over 1971's record total of 27.6.

With this summer's grain sales to the Soviet Union added to further increases in world demand for soybeans, the Agriculture Department estimates that exports this year will total more than 500 million bushels, an increase of at least 20 percent over last year's 423 million bushels.

The pressure of demand and the low carryover from last year's huge crop are pushing prices to a record high and the department is predicting that this season's average price for the United States will be from 5 to 10 percent above last year's excellent average price of $2.96 a bushel.

"Beans are my big money crop now," Hanson told a visitor.

"We've always before been corn farmers in my family. We're still in corn, of course. But now we're moving up to planting half of our land in beans. Some years beans bring more than corn and if we didn't have to rotate with corn, we might be growing even more beans than now."

Hanson, a cheerful, athletic man whose bright blue eyes and wind-reddened complexion point up his Norwegian ancestry, knows there is nothing new about the fact that soybeans are grown in Iowa. He has been planting them since 1948, when he started helping his father run the family farm here in Webster County in central part of the state.

"In those days, soybeans were looked on as just something to plant on acres we had to hold the corn off of," he said. "Then you'd be lucky to get 30 or 40 bushels to an acre and they were paying barely $2 a bushel for those beans."

Recently, as the soybean harvest in the upper Middle West neared its peak, Hanson's yields were running above 45 bushels to the acre. Some Iowa farmers to the north of here were averaging 50 bushels an acre.

But what really brought smiles were the prices farmers were getting for those yields. Even with a record harvest in sight, country elevators in Iowa were paying as much as $3.23 a bushel for beans, well above last year's average of $3. And if any more cheer were needed, it could be found in the soybean prospects for the coming year. As world demand has risen steadily, the carryover —the amount of soybeans unused from the previous year —has dwindled.

The Agriculture Department reported a Sept. 1 carryover from the last year of only 72 million bushels, down 27 percent from 1971. The carryover was less than one-quarter the size of that in 1969, when the unused soybeans reached a peak of 324 million bushels and market prices dropped well below the government loan price of $2.50.

The largest cash crop in the United States in terms of production is corn, which was valued in 1971 at $5.9 billion. The value of soybeans and wheat for the year were $3.5 billion and $2.2 billion, respectively.

However, in terms of sales, which discounts the value of the grain used by the grower for feed, soybeans and corn were almost equal last year. The value of corn was $3.4 billion against $3.3 billion for soybeans.

In terms of exports, soybeans are exceeded in volume by both corn and wheat. Last year 588 million bushels of wheat, 506 million bushels of corn and 423 million bushels of soybeans were exported.

In dollar value, however, soybean exports last year were higher than both corn and wheat. The value of soybeans exported was $1.3 billion, compared with $991 million for wheat and $741 million for corn.

When soybeans, brought to this country from China in the early part of this century, began to appear as a basic crop after World War II, the oil they produced was their primary offering.

As margarine, cooking oil and plastics grew in popularity, so, too, did the demand for soybean oil, though this demand never caught up with supply. Soybean meal, the other product of soybean processing, was used mainly as a basic component of livestock and poultry feed. As such, it played a greatly reduced role in comparison with corn.

Today the opposite is true. As the world's appetite for meat and poultry has grown in Europe and parts of Asia, the demand for soybean meal as feed has grown too, until it now outstrips the demand for soybean oil.

The high protein content of soybean meal has caught the eyes of nutritionists, who see it as a versatile diet supplement. The meal can be made to look and, to a degree, taste like a surprisingly wide range of food items, from milk to hamburgers.

The Houston Chronicle
October 29, 1972

A MEAT CUTTER

TEXAS EMPLOYMENT COMMISSION

Cuts and trims meat into specified cuts, sizes, and weights

May collect money for sales; may inspect and grade meats

ALSO

May wrap and weigh meats for customers

Cleans and cuts fish and poultry

A MEAT CUTTER MUST

Have a Food Handler's Certificate

$$$ THE PAY $$$

From: $2.50 per hour
To: $4.50 per hour

THE HOURS

Usually 8 hours a day
40 -45 hours a week
May be weekend and evening hours
Part-time work available

Extras You MAY Get:

- Life & health insurance
- Pension plan
- Paid vacations
- Uniforms
- Credit union
- Sick leave
- Paid holidays
- Profit sharing

A MEAT CUTTER SHOULD

Be in good physical health and able to lift 100 pounds or more
Be able to stand 8 hours a day
Have good eyesight
Have good eye-hand coordination
Not be color blind
Not mind noise or various odors
Be handy with tools
Be courteous and able to deal effectively with people

TEXAS EMPLOYMENT
COMMISSION

Floral Designer

The Pay

From: $1.60 per hour
To: $2.00 per hour

The Hours

40 to 48 hours per week
(May work overtime)

A FLORAL DESIGNER Must...

- BE ABLE TO WORK WELL WITH HIS HANDS
- BE ABLE TO DO ARITHMETIC
- BE ABLE TO TALK WITH PEOPLE, AND TO GET INFORMATION
- BE ABLE TO WORK QUICKLY
- HAVE COLOR SENSE
- BE ABLE TO BE ON HIS FEET 8 HOURS A DAY
- BE ABLE TO WORK UNDER PRESSURE
- BE ABLE TO WRITE DOWN ORDERS ACCURATELY

Learns How...

ON-THE-JOB, AND AT
VOCATIONAL SCHOOLS

A FARM-EQUIPMENT MECHANIC

Inspects, services and repairs farm equipment

Does preventative maintenance

Uses testing and welding equipment, as well as hand tools

TEXAS EMPLOYMENT COMMISSION

1

A FARM-EQUIPMENT MECHANIC SHOULD

Be at least 18 years old

Enjoy mechanical work

Be able to work independently

Be able to work outside in all kinds of weather

Be in good health and able to do some lifting

Have good eye-hand coordination

Be able to work around dirt, grease and oil

Be able to read and understand manuals

$$ THE PAY $$

From: $2.50 per hour
To: $4.15 per hour

THE HOURS

40 to 48 hours a week

Extras You MAY Get

. House and utilities . Pick-up truck

. Industrial insurance . Paid vacations

TREE TRIMMER

The Pay

From: $2.10 per hour
To: $3.00 per hour

The Hours

. Usually 44 hours per week

. Seasonal work

A Tree Trimmer Should· · ·

HAVE A DRIVER'S LICENSE
BE IN GOOD HEALTH
BE ABLE TO READ AND WRITE ENGLISH
BE ABLE TO LIFT AND CARRY HEAVY LOADS
LIKE TO WORK OUT OF DOORS
BE ABLE TO OPERATE ELECTRIC AND GASOLINE-POWERED EQUIPMENT
BE WILLING AND ABLE TO WORK AT HEIGHTS
BE ABLE TO GET ALONG WELL WITH OTHERS
BE FREE FROM HAY FEVER

How to Find the Job· · ·

BY APPLYING WITH:

TREE SERVICE FIRMS
CITY AND COUNTY PERSONNEL OFFICES
ELECTRIC COMPANY PERSONNEL OFFICES

Learns How· · ·

ON-THE-JOB
TREE SCHOOLS

To Young Men and Women Considering Careers:

FRANK N. IKARD
President,
American Petroleum Institute

THE YOUNG PEOPLE you will meet in the following pages work in the oil industry. Not one of them is "over thirty."

I mention this age level not because I believe any great majority of you put stock in the slogan "Don't trust anyone over thirty." After all, if you took advice like that seriously, you would have to doubt too many good people you *know* you can trust.

I do believe, though, that during the crucial time when you are thinking about what your own life's work will be, you may welcome the opportunity to hear from these young men and women who are only a few years your senior. They are doing now what you yourself will be doing, perhaps in a very short time — that is, getting well into chosen careers.

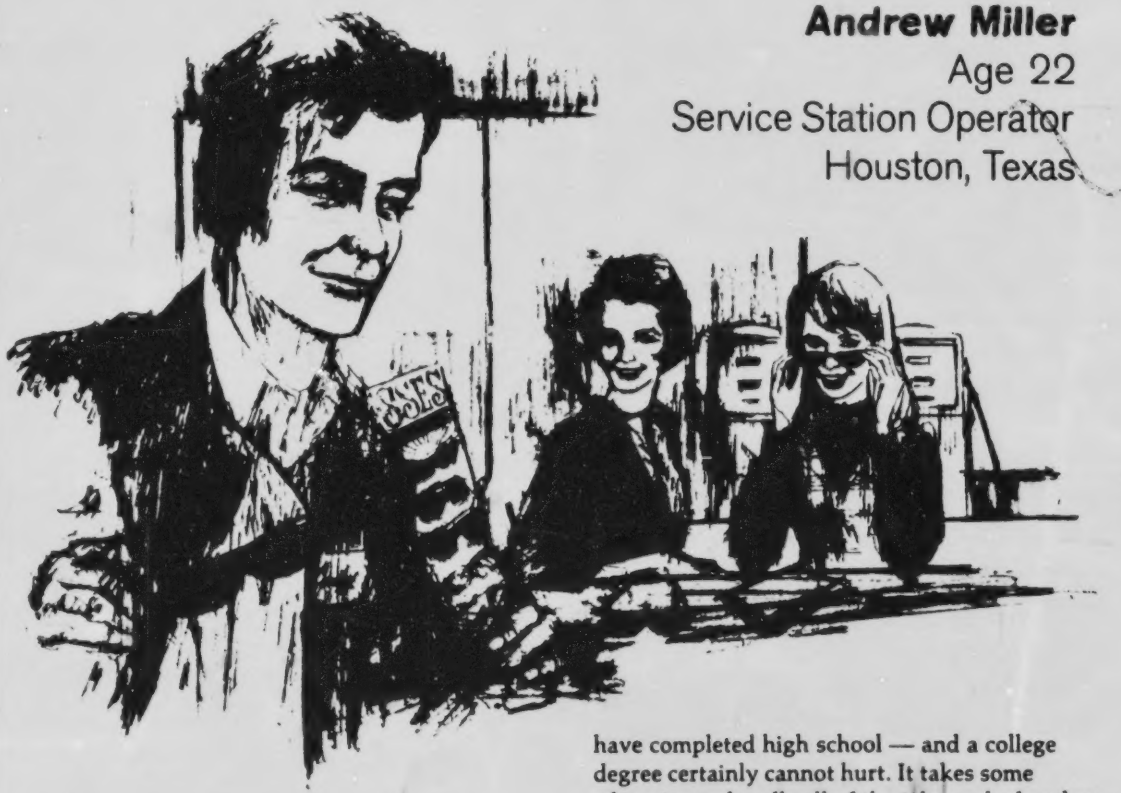
You may be planning on going to work right away. Or you may be looking forward to entering college and, later, law, medicine, teaching, or one of the other professions. Or you may be pointing toward a career in government service. Career decisions in these areas of human endeavor are all to the good. No reasonable person, under thirty or over, could deny their importance. But neither could any reasonable person deny the importance of getting another kind of the world's work done, the work of industry generally and certainly of the oil industry, which is so important to all of us.

Upon the oil industry falls the responsibility for supplying hundreds of millions of people in our own land and abroad with the energy to warm their homes, cook their meals, and power their fleets of vehicles and great machinery complexes, as well as for providing literally thousands of different kinds of petroleum and petroleum-based products.

While you are shaping your decision about your own future, you may wish to give consideration to a career in the oil industry. It has a great deal to offer. You will find, for example, hundreds of different kinds of jobs to choose from — many of them highly creative, all of them together representing a substantial cross section of the jobs to be found in our society as a whole. You will find salaries and employee benefits that rank among the very best. You will find a stable industry that affords not only maximum job security, but also plenty of chances for advancement.

Most important of all, like the young people featured in this booklet, you will find opportunities to achieve personal satisfaction — the kind of satisfaction that comes only from doing work which involves turning ideas into realities and upon which many others, as well as you yourself, can place high value.

Permission for the use of this message and the following 16 short stories was given by Mr. Earl Grabhorn, Educational Director of the Oil Information Committee of the Texas Mid-Continent Oil and Gas Association.



Andrew Miller
Age 22
Service Station Operator
Houston, Texas

"I'VE MY OWN BUSINESS. I like it that way. The amount of money I make depends primarily on *me* — on how many ideas I come up with, how good they are, and how hard I work at them. Indeed, running my own service station means so much to me that I recently turned down a chance to go back home to England as a merchandiser for one of my supplying company's international divisions.

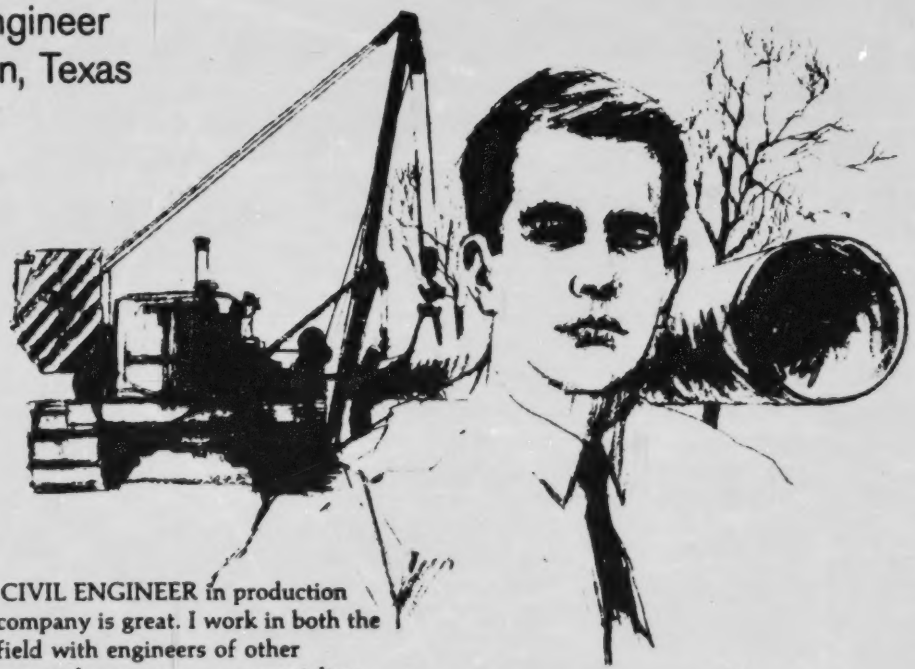
"I've plenty of reason to believe that the greater opportunity lies here — even though once in a while I do still say petrol when I mean gasoline. In the first month after leasing my station, I was able to double my previous income. I now have five employees. We can handle 30 cars per day for lube jobs and oil changes, and our gasoline sales are running at 45,000 gallons per month.

"One need not be a genius to run a service station successfully. One ought, however, to have completed high school — and a college degree certainly cannot hurt. It takes some education to handle all of the jobs packed under a service station roof: controlling inventory, keeping sales and credit records, directing employees, scheduling service and repair jobs, sales promotion, advertising, all that sort of thing.

"It takes some practical knowledge, too, not only of business administration, but also of automobiles, which change from model year to model year. The supplying oil companies and many of the equipment manufacturers here in America are very good on this score. They provide any number of bulletins, manuals, and training programs for service station operators.

"It's no job for a hermit. A good service station operator has to spend time working the drive and talking with his customers. They care about the brand of gasoline they buy, but they care more about how they're treated. Give them first-rate service — they come back. And repeats are the heart of this business."

Larry Long
Age 23
Civil Engineer
Houston, Texas



"BEING A CIVIL ENGINEER in production for a large company is great. I work in both the office and field with engineers of other disciplines, research men, computer specialists, construction contractors — all kinds of people. I also have a lot of freedom in switching from one type of operation to another. Opportunities for advancement in responsibility and salary are excellent.

"Basically, my job is to help increase the company's efficiency and safety in the production of gas and oil. We are concerned with the economics of our facilities and the conservation of our natural resources, including air and water. I'm therefore involved in many different kinds of engineering work — for example, analysis of offshore structures, field inspection, and construction. I've served as construction engineer on several jobs. On one project involving a pipeline relocation, I was responsible for making a study to determine the extent of the project, writing specifications for use by the contractor, and preparing cost estimates for management approval.

"The construction of pipelines interests me. Building them is a real engineering challenge, since they cross not only open country, but also bays, rivers, swamps, and hills. I find gas plant work interesting, too, in that it involves millions of dollars worth of facilities for processing hundreds of millions of cubic feet of gas each day.

"My job requires an engineering degree, and practical experience is a big help. A civil engineer in the petroleum industry never knows when he may be called on to build a road, analyze a permanent platform to be built in 100 fathoms of water, or assist in planning a refinery installation, supply terminal, or marine facility, complete with utility systems and heliport. The great variety of engineering problems and the many people I work with — these two things make my job especially rewarding."

Susie Ho, Age 27, Programmer
Los Angeles, California

"I ATTENDED HIGH SCHOOL in Taipei, Formosa, and majored in business administration at the national Taiwan University. Then I came to the United States and attended the University of New Mexico, where I became acquainted with data processing techniques. From the very first, I found computer programming fascinating and took extra courses. I won a postgraduate scholarship at the University of California at Los Angeles, where as an assistant professor in data processing, I worked toward a master's degree.

"I took a summer job with the oil company, fully intending to return to UCLA in September. But things went so well that I have remained at work here.

"Although most companies do not insist that a programmer have a degree, the trend is to favor college graduates. I have found my degree valuable. A programmer needs algebra, statistics, and logic — disciplines that are best mastered with the help of formal education.

"College training also provides a store of general knowledge that gives a programmer guidelines in many fields. One can thus handle a wider variety of computer assignments, and versatility is especially valuable to the programmer in the petroleum industry, which is so big and so complex. It supplies about 75 percent of all United States' energy needs and employs 1,200,000 men and women in its operations, many of which are global.

"Complex operations on so large a scale can present very difficult problems associated with payrolls, geological information, new processes, transportation, and feasibility studies of many kinds. Some of these problems are so difficult that they can be economically solved *only* with a computer. This single fact is a source of much satisfaction for the programmer, who controls the computer. Without the programmer's work of sifting, arranging, testing, and recording, the computer — vital as it is — remains a useless machine."

Glendon Breedy

Age 25

Division Terminal Supervisor

Bayonne, New Jersey

"AS TERMINAL SUPERVISOR, I have operational responsibilities that include blending fuel products, loading and unloading tankers, and maintaining effluent facilities for control of harbor waters. In getting these jobs done, I supervise the activities of 35 people. This means that in addition to my operational work, I deal with union delegates on grievances, promote safe working practices, and administer certain personnel policies.

"On a regular day, I spend about three hours in the field and five hours at my desk. Both places provide valuable experience. As a professional in mechanical engineering, I need to know all I can about field work — about the actual installation of facilities like pipe stills and separators for treating effluents. But as a member of my company's management team, I also need to know how to make the most out of time spent behind a desk — studying processes, designing modifications of equipment, letting contracts, and dealing with suppliers.

"All in all, I've had the chance to carry bigger responsibilities than I ever expected to be carrying at this early point in my career.

"The company's management development program is broad. For me, it has ranged all the way from coordinating the construction of a Little League baseball field — a project sponsored by the local Chamber of Commerce and supported by the company — to working with industry and government people involved in worldwide petroleum operations.

"But the best thing of all about this management development program, in my opinion, is the company's firm policy of recruiting prospective managers from within whenever possible and letting them know that here, advancement is a direct function of imagination, ability, and effort."

Mike Glowacz, Age 23, Geologist
New Orleans, Louisiana

"TIME WAS WHEN KIDS took a job just for the money. No more. Most kids today want decent earnings all right, but they also want to work at something they believe is worthwhile.

"My own solution has been geology. It pays well, and it offers plenty of chances for worthwhile work. To name one, our population is growing fast, so our energy needs are growing fast. Economists tell us that for this country to maintain its present reserves-to-production ratio, the petroleum industry is going to have to find nearly as much oil between now and 1980 as it has produced in the entire 109 years of its existence. Geologists will be spearheading the search for all that oil.

"My job is interesting from day to day. It's kind of like detective work or a complicated treasure hunt. Ideas leading to new discoveries of oil come from a lot of places — skull sessions in the office over maps, trips into the field for surface work and well logging, and swapping information with other specialists like geophysicists, paleontologists, petroleum engineers, and land men. Once all the facts are in, we correlate them to find the most likely place to sink the 'wildcat'— our name for an oil well drilled in unproved territory.

"When the wildcat spuds in, I'm apt to lose some sleep. I have to be at the drilling rig when the logging starts, even if it's midnight, and get the logs back to the office in a hurry. Drilling is expensive, and those logs provide down-hole information that management needs in deciding whether to continue or abandon the project.

"I'd recommend geology as a career. It requires an interest in the physical sciences and the ability to reason things out. Advanced degrees help, but anyone with a bachelor's degree and solid on-the-job training can move ahead. There are lots of chances to travel, too. South America, the Middle East, the big oil states in this country — you can practically pick your spot."

Billy Gene Fellers, Age 27
Systems Accountant
Bartlesville, Oklahoma

"THE ACCOUNTANT'S IMAGE probably could use a little touching up. Quill pens, ink-stained fingers, and dusty ledgers compiled after the fact are out. Fast machines zinging out a whole new alpha-numerical language are in.

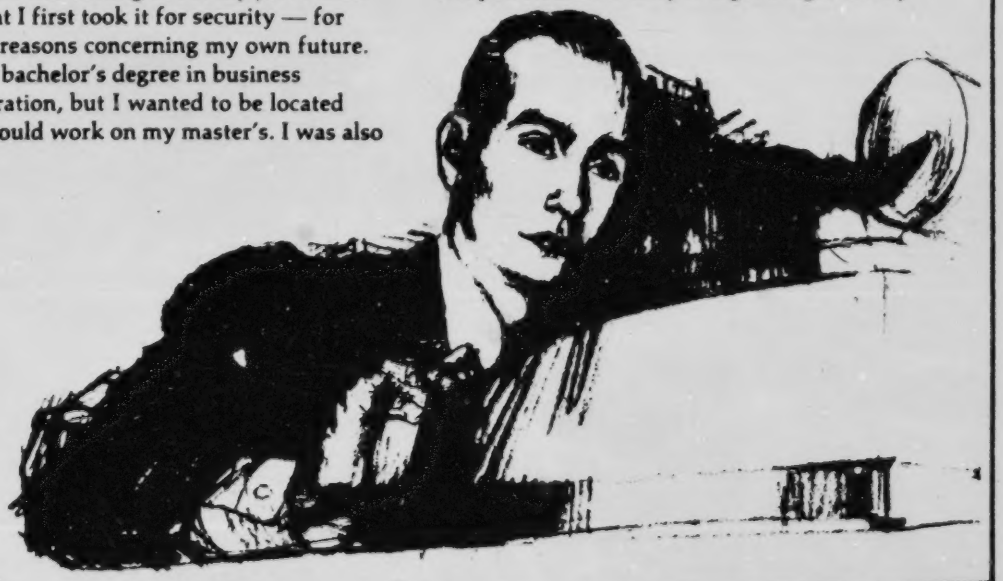
"Of course we still keep track of simple debits and credits that tell what company performance *was*. But that's 'keeping score' for the game. Today, we're right in the game as well. More and more, we're searching wider and digging deeper for clues that tell what company performance *will be* — a year or five years from now. This kind of information is absolutely essential to our top executives. They have the responsibility for charting the company's future — against some of the toughest competitors in the world, I might add.

"So to me and, I'm sure, to other professionals in the field, numbers and letters aren't just numbers and letters. They *mean* something. They represent people and ideas and actions, and they often do so with far more precision than words do.

"I like this feeling about my job. I must admit that I first took it for security — for practical reasons concerning my own future. I had my bachelor's degree in business administration, but I wanted to be located where I could work on my master's. I was also looking forward to experience that would help me fulfill the requirements for a CPA certificate, and I wanted opportunities for advancement. I've found what I was looking for, and I still think building soundly for future security is important. But now I also realize how important it is to have a job that holds my interest day in and day out.

"I do a fair amount of traveling, sometimes with senior analysts, to do one job or another for the company — for example, survey an accounting system, make recommendations for changes, or explain how machines can be utilized to do a job faster and better. In developing accounting systems, I'm involved with monthly financial statements, annual rate of return data, overhead application, and reports for company executives, our stockholders, and the government. I've also gone out in the field to discuss career opportunities in our company with university seniors, and I'm looking forward to more such trips.

"There is a lot of variety in my job. There is apt to be even more in the future. The petroleum industry is a growing industry."



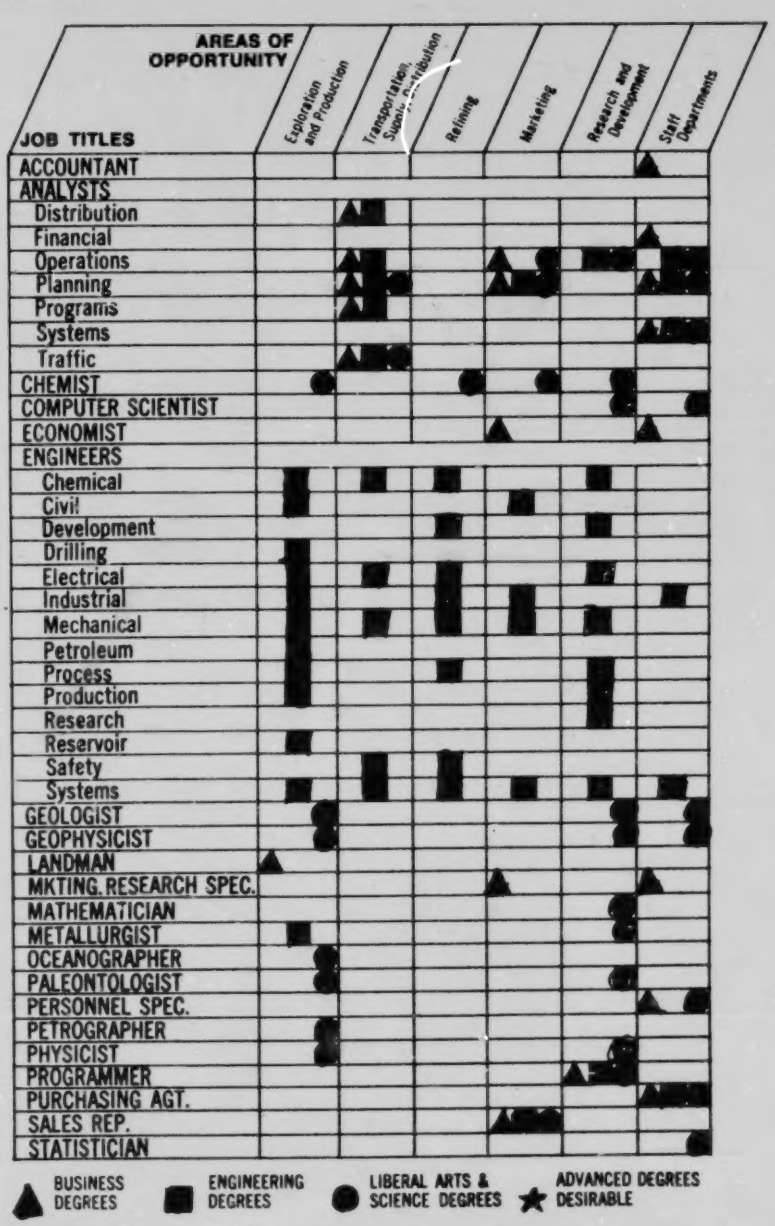
CAREER OPPORTUNITIES IN THE OIL INDUSTRY

Because of limited space, this section lists only some of the many different kinds of jobs in the oil industry. Descriptions of these and others can be found in guidance publications, college catalogs, and encyclopedias — all of which may be consulted in the school's guidance office.

JOBS REQUIRING DEGREES

Many jobs in the oil industry require four years of college leading to a bachelor's degree. But for a number of jobs, an advanced degree is highly desirable — the master's or the doctorate.

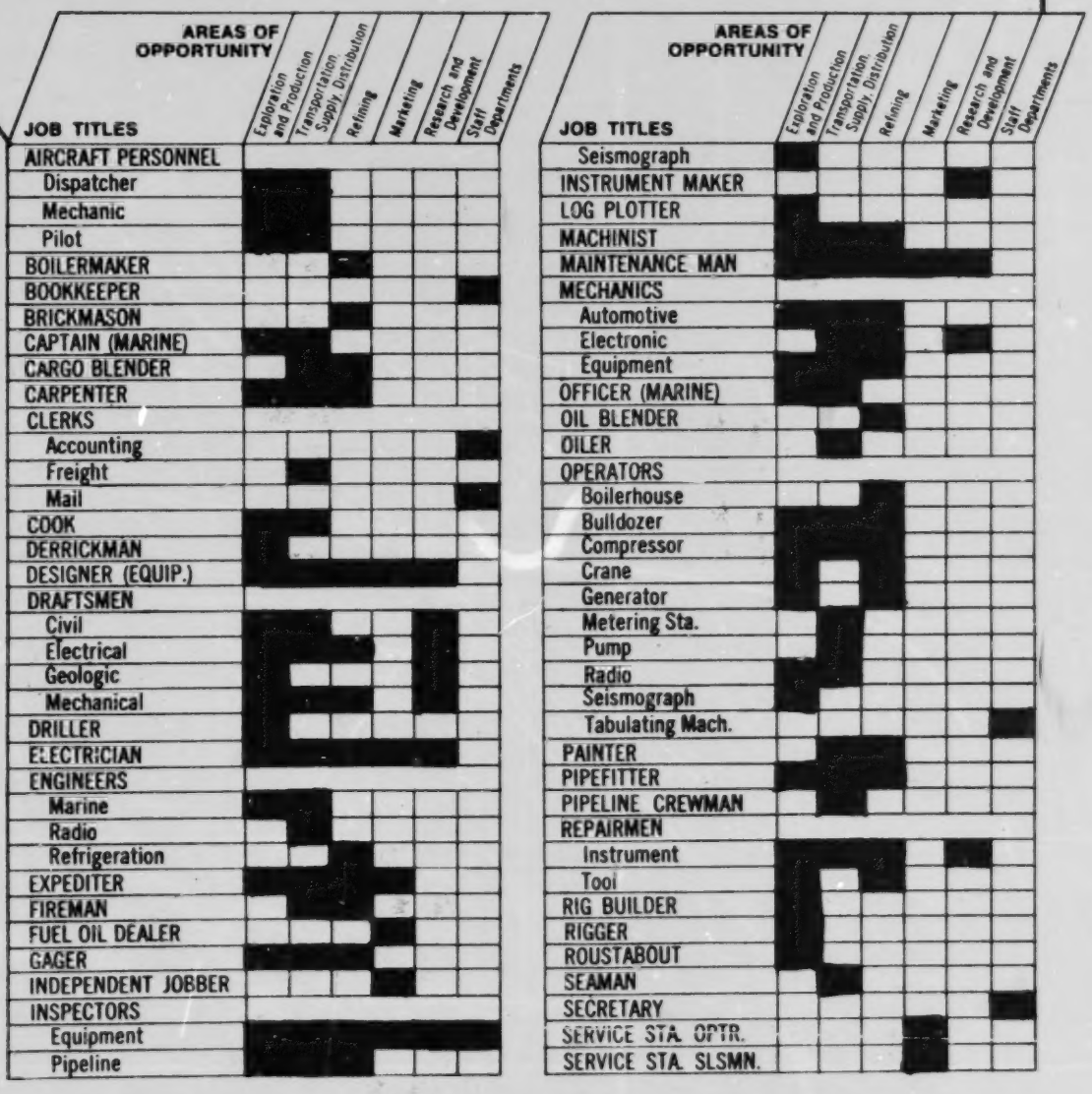
The chart at right represents general career opportunities in the oil industry, but is by no means hard and fast. As mentioned previously, but not shown exhaustively on the chart for the sake of clarity and simplicity, many staff functions are required by all of the main divisions of the industry. The job title "Accountant," for example, appears in the chart only under the heading "Staff Departments," but could appear under all of the other headings as well. Again, a chemist or an engineer or another specialist with the right temperament often elects to go into an area like sales. Finally, throughout their careers, successful managers and executives more often than not make a point of gathering experiences not only in their immediate areas of responsibility, but in others as well.



JOBS REQUIRING HIGH SCHOOL DIPLOMAS AND/OR SPECIAL APTITUDE, EXPERIENCE, INTENSIVE TRAINING

Strictly speaking, a high school diploma is not absolutely essential for every one of the jobs listed below. With the increasing emphasis on education across the nation, however, more and more employers of all kinds are considering the diploma all but indispensable.

Much the same thing said previously about jobs requiring degrees holds true for the following jobs requiring diplomas, special aptitudes, experience, or training, or all these. That is, the indicated job categories are not hard and fast. Many staff functions are required throughout the industry.



In Grams by Kentucky Students

Oil Produced from Leaves

BY KATHY PELLEGRINO
Associated Press Writer

Louisville, Ky. — A student project shows there is undiscovered oil in a lot of American backyards.

But don't quit work yet.

A group of students at the University of Louisville proved this summer that oil can be produced from leaves. But it takes a lot of leaves and a lot of money to produce a little oil.

Armed with a $12,930 National Science Foundation grant and several bags of leaves they collected last year and stored, 12 students set out to determine how they could turn the simple leaf into useful products.

Those products included oil and an activated charcoal of the type used as a filtering agent in tertiary treatment at sewage treatment plants.

Dr. Thomas Crawford, faculty adviser, said the idea to try to produce oil stemmed from work the U.S. Bureau of Mines had done in converting animal wastes to oil.

"We got a comparable yield," he said. "They can get about two barrels from a ton of manure. We can get the same from a ton of leaves."

The students produced oil on a small scale — in quantities of grams — using what they called the "bomb" or a high pressure reactor in the corner of their basement laboratory.

By heating the leaves to 400 to 450 degrees to create pressure and injecting hydrogen gas and carbon monoxide, they reduced the leaves to a gooey black substance that left oil when the residue was removed.

This oil form, when subjected to a catalyst, becomes fuel oil. But the process is not now feasible from a cost standpoint.

"We're not a major threat to the oil companies," quipped Lewis Rowe, 22. "We haven't seen the stock market crumble."

But the long-range outlook, according to the students, may be different. In the year 2000 or 2020, they say, a death of natural oil could make the process of leaf conversion more practical.

The student project director, Stephen Hubbs, a junior majoring in environmental engineering at the university's Speed Scientific School, said analysis of the oil produced from the leaves drew a good report.

The activated charcoal was made with ground leaves heated in the absence of oxygen. The activation was accomplished by shooting steam through the "roasted" substance.

"We didn't solve the problem of leaf disposal," Dr. Crawford said. "But maybe in the long run our information will turn out to be useful."

September 16, 1972

The Houston Chronicle

U.S. Rotary Rig Total Rises During Week

The number of rotary rigs running in the U.S. increased to 1190 in the week ended Nov. 13, according to Hughes Tool Co.'s weekly report.

This week's total compares with 1137 rigs last week, and 114 a year ago.

The total rigs in Texas increased to 344, up from 313 a week ago and 327 in the similar week in 1971. Land rigs in South Texas and along the state's coast decreased to 92 from 93 the previous week. The total a year ago was 83.

Rigs in Louisiana increased to 224 this week, compared with 218 last week and 216 in the corresponding week a year ago.

Oklahoma rigs dropped to 97 from the year ago total of 114, but were up from the week ago total of 93. Alaska rigs totaled four, the same as last week and last year.

September 15, 1972

Oil Allowable Hike Requested

Austin (AP) — Major buyers of Texas crude oil have asked the Railroad Commission for 3,776,593 barrels a day next month, an increase of 25,176 from this month.

The commission said Friday that the U.S. Bureau of Mines forecast for October demand for Texas crude oil is 3,500,000 barrels a day, a decrease of 25,000 from September.

The commission meets Tuesday to set the statewide oil allowable for October.

DUTIES OF A SOIL CONSERVATION ENGINEER

Drainage

Designing and supervising construction of drainage systems of different sizes.

- Determining capacity, depth, spacing, and side slope of open or closed drains.
- Determining benefits and damages.
- Providing for removal of saline and alkaline salts.
- Investigating ground-water movement and subsoil layer.
- Investigating quality of materials.
- Preparing specifications.
- Auxiliary works such as pumping plants, control structures, and dikes.

Irrigation

Designing and supervising construction of farm and ranch irrigation systems.

Developing water-supply, conveyance, and distribution systems and management programs.

- Land leveling.
- Diversion dams.
- Storage reservoirs.
- Canals.
- Pipelines.
- Control structures.

Developing water-application plans.

Computing water requirements.

Soil Mechanics

Helping to make dam-site investigations.

Supervising laboratory tests to determine:

- Amount and rate of consolidation under loads.
- Structural quality of earth materials.
- Density-moisture relationships; permeability.

Interpreting tests and recommending for:

- Construction of earth-fill dams.
- Side slopes of embankments.
- Foundation stability.
- Drainage for structures.
- Cutoff trenches.
- Blanketing and reservoir-basin treatment.

Erosion Control and Water Conservation

Helping landowners and operators plan and establish the engineering phases of conservation plans.

Designing and supervising construction of:

- Farm ponds.
- Terrace systems.
- Diversion terraces.
- Waterways.
- Grade-stabilization structures.

Investigating effectiveness of erosion-control and water-conservation measures.

Geology

Investigation and interpretation of surface conditions in relation to:

- Design and construction of engineering structures.
- Ground water supplies—management and recharge.
- Sediment yield—sources, damage, and control.

Water-Supply Forecasting

- Establish snow course networks.
- Establish soil moisture and temperature stations.
- Analyze snow-survey data.
- Develop forecast parameters and formula.
- Develop water-supply forecasts.
- Adapt automatic data processing.
- Operate automatic radio-telemetry systems.

Material supplied by U. S. Department of Agriculture through the County Agricultural Agent, Houston, Texas.

PETROLEUM

Houston is noted as the oil capital of the world. Many salaries here depend directly or indirectly on oil. Each year new companies are moving their national or world headquarters to Houston. Recent examples are Shell and Signal Oil Companies. Other companies who have large refineries in the Houston area are Humble (Exxon), Gulf, Texaco, and Phillips. Land is still available in the Houston area, and prices are more reasonable than in many other places. Also, there are many oil fields near Houston, and oil field equipment manufacturers are plentiful here.

Hundreds of shift workers keep refinery lights burning brightly every night. Unused gas is burned in perpetual torches that create an unusual scene at night. In the daytime, there is an air of importance in the spectacle of gigantic machines and production lines.

Oil is big business and it creates good jobs. The owners and administrators of petrolum companies become very wealthy. Shift workers are well paid. A *shift* worker is an employee who takes care of the production line for a portion of the day. The usual length of time is eight hours. Someone is supposed to replace the shift worker after eight hours. If the shift worker must work more than eight hours, he receives time and a half for the overtime.

Our nation depends on oil companies to find new supplies of fuel in the United States, in the ocean, and in foreign countries. The scientists who study rocks and explore new sites for oil are called *geologists.* Chemists, logging, and other engineers join the research and production team. Many laborers are needed, too. They are called *rough necks.* Their pay is excellent, but they usually must move often. As new fields are discovered, the drilling crews and their families must continually move from place to place.

In order to safeguard the supply of oil, our government limits the number of barrels that can be pumped out each month. This curb on pumping is called an allotment. Future generations will be glad that we saved some of the oil while searching for substitutes. High school students recently found an oil substitute in leaves. Ask your teacher about this oil substitute story in the appendix of her guide.

Drilling for oil is a big risk, as wages and machines are high; however, the money that men make when they strike oil keeps them interested in the risks. The government adds an extra benefit for oil men. They are given a depletion allowance. This means the oil companies are excused from paying as many taxes on all their money as the average worker must pay. *Depletion* means a supply is used completely. Since our nation now runs on oil, the government wants to encourage investors to keep digging and searching for new fields. In oil, just as in any other business, the basis for decisions is usually the law of supply and demand.

INFORMATION CHECK-UP ON OIL

1. Name five oil companies located in the Gulf coast area.

   _____ _____ _____

   _____ _____.

2. Give three reasons national oil headquarters are moving to Houston.

   _____ _____

   _____.

3. Scientists who study rock formations in their search for oil are called.

   _____

4. A curb on use of a product or natural resource is called an _____.

5. The basis for prices, taxes, and limitations in oil business is the law of _____

   _____.

TEACHERS' ANSWER SHEET FOR INFORMATION CHECK-UP ON OIL

1. Gulf, Shell, Humble *(Exxon)*, Texaco, Signal, Phillips
2. port, oil field equipment, oil fields, inexpensive land, port (any three)
3. geologists
4. allotment
5. supply and demand

OIL PRODUCING PERSONNEL

(FOREIGN SERVICE)

International oil company has the following vacancies for expanding well workover operations.

FOREMAN-LAND DRILLING: To represent the company on contract workover rigs. Must have experience in oil well workover operations and should be able to interpret workover contracts and agreements and apply pertinent data to daily operations.

FOREMAN-FIELD SERVICES: To supervise several crews both on and offshore including shop area for tool and equipment repair. Will be responsible for non-routine maintenance of oil, gas and water induction wells. Must be capable of functioning with a minimum of supervision.

SUPERVISOR-DRILLING TOOLHOUSE: To support workover operations. Must have extensive experience in drilling type toolhouse operations. Work includes ordering, receiving, storing, shipping and repairing drilling tools and equipment valued around $5,000,000. The unique ability to innovate, improvise and substitute is essential.

Good family facilities and full range of company benefit plans.

PLEASE SEND RESUME TO:
P.O. BOX 1433, F.D.R. P.O. STATION
909 THIRD AVENUE, NEW YORK, N.Y. 10022
An equal opportunity employer

LAB TECHNICIAN

Progressive oil company is in need of a lab technician to work in Southwest area. No experience necessary but background in college or high school chemistry helpful. Send complete resume to

Chronicle Box 1285

An equal opportunity employer

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MANAGERS
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6 to 3 and 3 to 12 Shifts Available.

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Experienced In
REFINERY-SNG-NATURAL GAS

HOUSTON INTERVIEWS

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1100 Cows, Hegs, Sheep

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THEN TRY OUR REGISTERED Black Angus Bulls and Females REASONABLY PRICED
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BABY CALVES
FEEDERS & GOATS. 333-9381

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REG. BRANGUS BULLS. 18-24 MO. 9488-9388. 346-1445 — 444-8611

90 Head of Good Black Angus COWS. SOME SPRINGING GOOD SELL ALL OR PART. — 353-9352

REGISTERED Hereford with Heifer calf. $550. Also mixed Heifers and Heavy Springers. 694-9380.

NORTH HOUSTON LIVESTOCK, Inc. Cattle Sale every Fri 1 p.m. 801 Rankin Rd. HI 3-1888—448-2881

SEMEN Chiondo-Ficana, Limousin Dandin C & others. Maine - Anjou, Simmentol, Charolais, Brahmon, British Breeds. Write - Call G. H. Gordon, P.O. Box 263, Hallettsville, Texas. 77964. 512-798-2937.

27 CROSS-BRED Cattle, & 2 calves, rest are heavy springers. 448-1121 after 5 p.m.

16 CHAROLAIS - 45 Angus - 175 crossbred heifers. Columbus 732-2760 Beaumont 892-0861.

SHIP ON APPROVAL YOUR PLACE — 15 Black Angus Heifers. $2,950. John Barnes (512) 674-6534.

40 LARGE TYPE BLACK ANGUS Cows. Young & some heavy springers 373-0478

70-COWS-&-CALVES
3 BULLS — 443-3464

PUREBRED HALF French Charolais bull and heifers. Buy now and pay next year (with approved credit). A. J. Hewem 771-6311, 465-7157.

30 GOOD black Angus cows. 4 calves, 5 young black whiteface cows, 2 reg. Brahmin bulls 372-2171

BUFFALOS (2). American Bison cow and calf, $995 for both or best offer, 666-4249 or 667-9381.

BUFFALO'S LARGE BRED COWS, LARGE BULLS. 697-8775

EWTIRE Herd for sale. Reg. Angus cows, bulls. Charolais bull. Horses. Call for appointment. 468-2035.

EXCELLENT JUMBO Brahma bulls —2 yrs. old. Pecan Acres Ranch, Paul Sabroula Manager. Phone 346-1321, Simonton, Texas.

1110 Stock Trailers

STOCK TRAILER 14'X8' HYDRAULIC BRAKES, ALL LIGHTS. New. 741-4216. 944-8842

NEW STOCK TRAILERS
W/brakes. $595. 2½ UP.
2-HORSE w/brakes. $795. & UP
COMPLETE TRAILER SHOP.
TRAILER RENTALS.
B&B WESTERN SALES
6080 N Shepherd
697-1616 697-8252.

1120 Horses, Mules, Etc.

HERD Reduction Sale. Have sold all Reg. Horses, that we planned to sell at this time. Still have 10 good Ranch Horses. Sell or trade. 729-3075.

TRAIL RIDING HORSES, & PALOMINO COLT. STABLES & PASTURE. 443-8482 — 693-4441.

10 HEAD Walking Horses. Will trade for almost anything. 801 Rankin Rd. 443-9927.

GOLDEN Palomino Stud, 2½ yrs. old. Well trained. Anybody can ride him. 15 hands high, weighs 1000 lb. OX5-8077.

QUARTER Horse Mare, reg. APPALOOSSA, 5 yrs. old, 448-9527 after 7 p.m.

QUARTER Horse. 3 yr. Bay gelding, double-bred King, Dav 421-1216, evenings 785-8601.

REGISTERED QUARTER HORSE BLACK with WHITE markings. $250.00 467-1622

SOUTHWEST Stables Inc. West of SW Frwy off Bissonnet, 48 Acre Pasture, lighted riding Arena, New Stalls, Individual Feed & Tack Storage. 496-0630 —782-8234.

CREAM-BEIGE MARE. ABOUT 6 YRS. OLD. $185. OR WILL TRADE FOR GELDING. 723-9186.

10 YR. OLD Paint Mare. Very Gentle. Ideal for children. Good saddling galt. $100. OV 6-7223.

HORSES TRAINED: Western pleasure, roining, halter, games. 946-8289 after 7 p.m. References available.

LEOPARD appaloosa stallion, 4 yrs. Injured foot. Very reasonable. SU 1-1673.

BLAZED FACE SORREL WITH STOCKINGS. USED SADDLES BUY & TRADE. 12000 Almeda, 729-6862 433-3547.

GRADE MORGAN, responds to light hands, Quarter type gilding. $160. 2 saddle S.W. Pasture, $12 per head. 783-0448.

REG.; AGHA, 3 Yr. Old Bay Mare. Trained for Western Pleasure. $400. — 463-8291

2 BIG GELDINGS 5 & 7 YRS. $130 EA. 2222 WIRTCREST. 461-5280 - 686-2878

6 GOOD WORK MULES
333-9252.

10 HEAD, GOOD, GENTLE, RIDING HORSES. $100. & UP. 442-7402

BIG LINEBACK DUN COW HORSE, PRETTY PAINT MARE. $225. EACH. 461-5280 — 686-2878.

REGISTERED APALOOSA COLT. Good looking. $225. 729-3130

REGISTERED Appaloosa Stud Colt. 18 mos., 14½ hands, bay with snow flakes. 351-0070 day. 222-2959.

BEAUTIFUL REG. APPALOOSSA 3 YR. OLD GELDING, CHAMPION STOCK. 458-3118 — 946-8814 AFT. 5

15 HEAD OF WESTERN PLEASURE RIDING HORSES. 3 TO 8 YR OLDS. 443-3464

5 YR. Blue Grey Gelding. 14 hands. $120. Dun Gelding 15 Hands. $130. 466-7622. 463-4424.

IMPERIAL HORSE TRAILERS NEW & USED. SALES — RENTALS. All sizes. TERMS-TRADE. MARKET ST. FEED 12866 Market St. 453-1421

THE STANDARD of excellence in Horse Trailers Miley Authorized Dealer. Cutter Bill Western World, 5647 Westheimer. 622-5105. Financing & trade-ins.

DEALERS Wanted; goose neck trailer Mfg. C., Bryan, Tex, local inventory. Corpo. stocks. Houston. 692-5127.

1120 Horses, Mules, Etc.

WANTED TO Buy quarter type fox trotting horse. Mare or Gelding. Not over 7 yrs old. Sound & Gentle. Not over 15 hands. Weight around 1100 lbs. P.O. Box 696, Montgomery, Tex. 597-4433 before 7:30 a.m. or after 4 p.m.

PROVEN Halter-Pleasure-Games. 8 year old Gelding. Experienced Rider. $400. Phone 453-4368 after 4.

BEAUTIFUL PALOMINA CHILDS HORSE. 2 yrs. old. Well mannered. $150. 453-2828 — 433-1274.

VERY GENTLE MARE WITH 3 MO. COLT $250. OTHER MARES & COLTS. USED SADDLES. 682-7211.

10 YR. OLD PAINT MARE. Very Gentle. Ideal for Children. Good saddling galt. $100. OV 6-7223.

NEW LOAD, Horses & tack to sell Saturday, 7 p.m. 5 mi. S. of Pearland on Hwy. 35. 686-2066.

HORSE SALE Saturday night, Oct. 28, 6:30. WINNIE LIVESTOCK EXCHANGE IH 10. (713) 296-2777 or 722-9674.

60 ACRE Pasture. $10 per horse. Discount on more. 433-2981

REG: QUARTER HORSE MARE, EXCELLENT SHAPE, OPEN, WITH BEAUTIFUL 4 WK OLD FILLY COLT, BOTH $400 — 427-4367

REG. Appaloosa gelding, 8 yrs. old, very well trained, outstanding qualities. 351-5543

1130 Hay and Grain

PRAIRIE OR BERMUDA HAY From field or barn. Heavy bales. Can deliver. Don Johnson. 222-0822.

BAHIA GRASS SEED
Tested. UN 4-6655 or UN 4-2494

CLEAN—PRARIE—HAY .65c OUT OF THE BARN 351-5589

COASTAL BERMUDA HAY. Highly Fertilized. At OUR Barn. 85c. Tomball (Windy Lakes) 351-5396.

1140 Eggs, Poultry, Chicks

QUAIL & PHEASANTS
$1 TO $3.50 — 442-8578

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EXPERIENCE NOT NECESSARY

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The Houston Chronicle
October 26, 1972

EMPLOYMENT PREDICTIONS

Agri-Business*

There have been marked changes in the composition of the state's labor force since "cotton was king" and Texas was known as a farming and ranching state. Even though the production of farm commodities and livestock has increased, and still provides a sizeable share of the state's income, employment—as well as population—on Texas farms has experienced a steady decline. The reason for this downtrend has been twofold: farm mechanization and other technological advances have made it possible to produce more crops with fewer farm workers, while at the same time the expanding urban industries have created a demand for more workers in the cities.

In 1960, the Agriculture, Forestry, and Fisheries industries (including agricultural production) accounted for 10.4 percent of all employment in Texas. By 1968, in line with a national trend, the proportion of Texas employment engaged in these activities has declined to 7.4 percent. A further decline is expected by 1975, when only 6.2 percent of all employed Texas workers will have jobs in this industry group. Mechanization and other improved techniques have tended to decrease the number of workers required in agriculture—especially in the production segment. The rate of employment decline in Agriculture, Forestry, and Fisheries in Texas between 1968 and 1975 is expected to be about one-half that predicted for the entire nation.

Natural Resources*

MINING

For all practical purposes, the category of "Mining" in Texas is primarily petroleum and natural gas production. Over 90 percent of the employment in Texas' Mining industry is in the area of oil and natural gas recovery and field services pertaining to such activity. Between 1960 and 1975, Texas will show a much faster yearly decline in employment in this industry than will the nation as a whole. Legislation decisions prompted by foreign competition and other international developments can often increase the output of this industry; however, automation has made possible considerable production increases with little or no corresponding increase in employment. Therefore, while most sources are forecasting gains in the quantity of oil and natural gas produced, employment in this industry is expected to continue its gradual decline through 1975.

*DRILLING***

A developing shortage of manpower and drilling rigs may affect the final total but there already is indication 1972 domestic oil and gas drilling operations will exceed the levels of the past two years.

Warren L. Baker, executive vice president of the International Association of Drilling Contractors, says an excellent growth pattern the first nine months makes it certain 1972 will become only the sixth year since 1955 to record an increase in drilling operations.

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* *Texas Employment Outlook to 1975 by Industry and Occupation.* Published by Texas Employment Commission, July, 1971.

***The Houston Post*, October 15, 1972

Monthly averages for active rotary drilling rigs so far this year have ranged from a low of 1,005 in May to a high of 1,149 in September. Last year's activity saw an 830 low in March and a 1,175 high in December. The 1970 averages ranged from a March low of 938 to a December high of 1,176.

The 12-month average for 1971 was 975 active rigs, compared with 1,025 in 1970.

The all-time record average of 2,687 active rigs was set in 1955 when the industry completed 56,682 wells. Only 27,835 wells were completed last year.

Spiraling demand for petroleum and natural gas and the prolonged slump in drilling explorations for new reserves have been prime factors behind the nation's developing energy crisis.

At the end of 1955, proved domestic crude oil reserves were equivalent to 13.1 years of production and proved natural gas reserves were equivalent to 22.5 years of production. By the end of 1972, these reserves-production ratios had dropped to 8.9 years for crude oil and 12.1 years for natural gas.

While confident the final 1972 drilling average will be the highest since 1969, Baker is cautious while discussing October-December averages. He is cautious despite the fact December often utilizes from 150 to 200 more rigs than September.

"The paramount question now is how many rigs drilling contractors will be capable of putting to work in December," he explains.

"A shortage of rigs and manpower may restrict the number of rigs put to work. Manpower already is in general short supply in most areas, and in some regions quite short. Some sectors already do not have enough rigs to fulfill drilling requirements in various depth ranges."

AGRI-BUSINESS
STUDY TOURS

Livestock

AMERICAN INTERNATIONAL CHAROLAIS ASSOC.
Thomas S. Murphy, Office Manager
1610 Old Spanish Trail
Houston, Texas 77025
748-1920, ext. 34

Description:
International registry for Charolais cattle.
Specifications:
Welcome tourists, students, U.S. and foreign groups; No minimum; Maximum 10; need one day advance notice; tours narrated; translating service available in Spanish; prefer touring 9 a.m. to 3 p.m. Monday-Friday.
Tour classification:
By arrangement only.

Meat Packers

ARMOUR AND COMPANY
802 Rankin Road—Just off Highway 45
Contact: W. L. Eads or R. P. Drain
P. O. Box 1532
Houston, Texas 77001
443-8551, ext. 62

Description:
Meat packing, cattle slaughtering, smoked meats and sausage processing.
Specifications:
Welcome tourists, students and U.S. adult groups; Welcome foreign groups on approval; technical or professional visitors admitted with proper ID; No minimum, Maximum 25; need 2 weeks advance notice; head coverings are provided by company; tours narrated; special discussions available on request; certain information restricted to all visitors; prefer touring 8 a.m. to 3 p.m.
Tour classification:
By arrangement only.

RATH PACKING COMPANY
6830 Mykawa Road
Contact: Lewis Pottkotter
P. O. Box 33160
Houston, Texas 77033
644-1371

Description:
Sliced bacon and sausage products.
Specifications:
Welcome students, U.S. and foreign groups; Minimum 5; Maximum 40; need one week advance notice; attire should include jacket or other wrap against cold; tours narrated; special discussions available on request; prefer touring 9-11 a.m.
Tour classification:
By arrangement only.

Dairies

SANITARY FARM DAIRIES, INC.
Whitney Caridine
1802 West Gray
Houston, Texas 77019
528-4163 or 528-4167

Description:
Processing plant for milk products.
Specifications:
Welcome tourists; Welcome student groups (no one under 11 years); Welcome U.S. and foreign groups; Minimum 15, Maximum 29; need one week advance notice; tours narrated; prefer touring after 1 p.m.
Tour classification:
By arangement only.

Game Farms

ORANGE GROVE GAME BIRDS
Mrs. Tom Stubbe, Sr.
4602 Orange Grove Drive
Houston, Texas 77039
442-3407

Description:
Raising game-birds - pheasant, quail and chukars. Live or dressed. Fertile eggs and chicks of all ages.
Specifications:
Welcome tourists, students, U.S. and foreign groups; No mimimun; Maximum 15; need 2 days advance notice; tours narrated, prefer touring 10 a.m. to 5 p.m. Monday–Friday.
Tour classification:
By arrangement only.

NATURAL RESOURCES
STUDY TOURS

Refineries—Oil & Gas

SIGNAL OIL & GAS COMPANY
9700 block of Manchester
Write: P. O. Box 5008
Houston, Texas 77012
923-6641

Description:
Refining operation.
Specifications:
Welcome students, U.S. and foreign groups; Minimum 15; Maximum 50; need 60 days advance notice; tours narrated; special discussions available on request; prefer touring 10 a.m.-noon.
Tour classification:
By arrangement only.

Oil Field Tools & Equipment

BROWN OIL TOOLS, INC.
8490 Katy
Houston, Texas 77024
464-1661

Description:
Oil field tools and equipment.
Specifications:
Welcome tourists, U.S. and foreign adult groups. No minimum; Maximum 50; need one day advance notice; tours narrated; special discussions available on request; translating service available in Spanish; prefer touring 8 a.m. to 5 p.m. Monday–Friday; tour duration 2 hours.
Tour classification:
By arrangement only.

AGRI-BUSINESS AND NATURAL RESOURCES

Speakers

Mr. J. B. Webster 225-0421
Forest Engineer, Kirby Lumber Company
(speaker, free material, loans films and filmstrips, arranges tours)

Mr. Fred Weinziel . . . . . 224-4211, Ext. 324
Agricultural Consultant, Texas Employment Commission
(7 nursery companies need constant help from older teenagers)

Mr. E. K. Shaw . . . . . 228-8311, Ext. 495
County agricultural agent, Room 203, 406 Caroline and Preston, Houston, Texas
Contact him for career materials, leadership, and awards in setting up hobbies or short term projects in more than 100 career fields.

Mr. Ralph Coatsworth 224-5637
South Central Area School Chairman of Texas
Mid-Continent Oil and Gas Association
2418 Bank of the Southwest Bldg., Houston, 77002
(Mr. Coatsworth is with Milchem, but he represents many oil people who pool their efforts to bring programs and materials to the schools.)

Miss Diane Savage 226-2195
Gulf Oil Company, P. O. Box 2100, Houston 77001

Mr. C. J. Phillips 781-3261
Western Geophysical, 8100 Westpark, Houston, Texas

Mr. Eugene C. Marshall 748-2566
Phillips Oil Co. Attorney, P. O. Box 1967, Houston, Texas 77001
He will try to assist as speaker with hobbies, give pamplets, and arrange study tours.

Mrs. Rebecca Mueche 526-1103
Dairy Council, 3000 Southwest Freeway, Suite 208, Houston, Texas

AGRI-BUSINESS AND NATURAL RESOURCES

Media

Film	Number	Time
The Agricultural Revolution: Man as the Food Producer Made by American Broadcasting Co. McGraw-Hill with Teachers Guide	L-5616	20 min.
Man's Basic Need: Natural Resources Encyclopaedia Britannica Educational Corp.	M-5234	
Problems of Conservation: Our Natural Resources Encyclopaedia Britannica Educational Corp.	M-5240	11 min.
What in the World is Water? McGraw-Hill	M-5451	12 min.
Can the World Be Fed?	M-4810	
Born in Freedom: Story of Colonel Drake The attempts to get commercial quantities of oil from the earth	L-4691	29 min.
It Might Have Happened Conservation techniques in oil industry	L-4692	26 min.
The Orange Grower Citrus farmer's daily business routine from groves to market	M-4473	16 min.
River of Power History of a U.S. oil well. Demonstrates many uses of by-products	M-4622	20 min.
Santa Gertrudis Breeds Profit The importance of beef cattle	4415	17 min.
Screen News Digest, Vol. 12, Issue 4 A pictoral history of the good and bad times in the evolution of American farming in the 20th century	M-4401	15 min.
Time to Live Shows importance of petroleum in man's work and in his leisure time	L-4693	29 min.

The River Must Live Nature purifies river water until polluted by man	M-4837	21 min.
Durum—Standard of Quality (The story of durum (macaroni wheat) from farm to table	M-5099	12 min.
Plant Nutrients and Growth (Examination of rice, wheat, and other energy foods)	M-5051	14 min.
The Dairy Farmer	M-3533	
The Farmer—Feast or Famine	L-3156	
Cattleman—A Rancher's Story	L-2595	

Transparencies (In O. O. Office)

The Story of Gas—13 pictures

The Story of Trees—11 pictures

**The Birds, the Bees, and the Trees*—6-1/2 min., 78 color slides with taped narration and musical background
(Traces the life of a tree; is an ideal starting point for the study of trees—their products and their role in the environment.)

Filmstrips (In O. O. Office)

The Earth People—color-sound filmstrip—gift from Texas Gulf, Inc., 200 Park Avenue, New York, N. Y. 10017

SAMPLES OF FREE MATERIALS FROM THE COUNTY AGRICULTURAL AGENT

Booklets for each student on whatever career interests he has are provided. A guide on each subject is given to the teacher. Demonstrations and pictures of short term projects are given on request. Rewards and Certificates of Membership are presented by 4-H leaders after short term projects are completed.

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*Available on loan free from
Southern Forest Institute
One Corporate Square, N. E.
Suite 280
Atlanta, Georgia 30329

AGRI-BUSINESS AND NATURAL RESOURCE

By Mrs. Mary Belt . . . . . Fondren Jr. High School

Pamphlets

E	"Metals"	Oregon Cluster G (see previous address)
E	"Jobs in Agriculture"	SRA Job Family Series Booklet (see previous address)
G	"Should you go in the Mineral Industry?"	Career Information Services N. Y. Life Insurance Co. (see previous address)
G	"Forest Policies of the Society of American Foresters"	Society of Am. Forester 1010 16th St. N. W. Washington, D. C. 20036
E	"So you want to be a Forester"	(see immediately above)
E	"Careers in Range Science and Range Management"	(same as above)
G	"Should you be a Forester?"	(same as above)
E	"Ask any Forester"	(same as above)
G	"The Challenge of the Forest"	(same as above)
G	"Range Conservationist"	(same as above)
G	"Opportunities in Resource Management"	Bureau of Land Management U. S. Dept. of Interior Washington, D. C. 20240
E	"A Job with the Forest Service"	(same as above)
E	"So you want to be a Forester"	Career Information Service N. Y. Life Insurance Co. (same as before)
E	"Your Farm Background and Agri-Business Selling"	Sales & Marketing Executives Int'l. 630 Third Ave. New York, N. Y. 10017
E	"Earth Science Career Symposium for Counselors" Handbook	HISD
E	"Career Opportunities in Oil"	"The Oil and Gas Journal" Special Report
E	"Agriculture Cluster Guide"	Oregon Cluster Guides (see previous address)

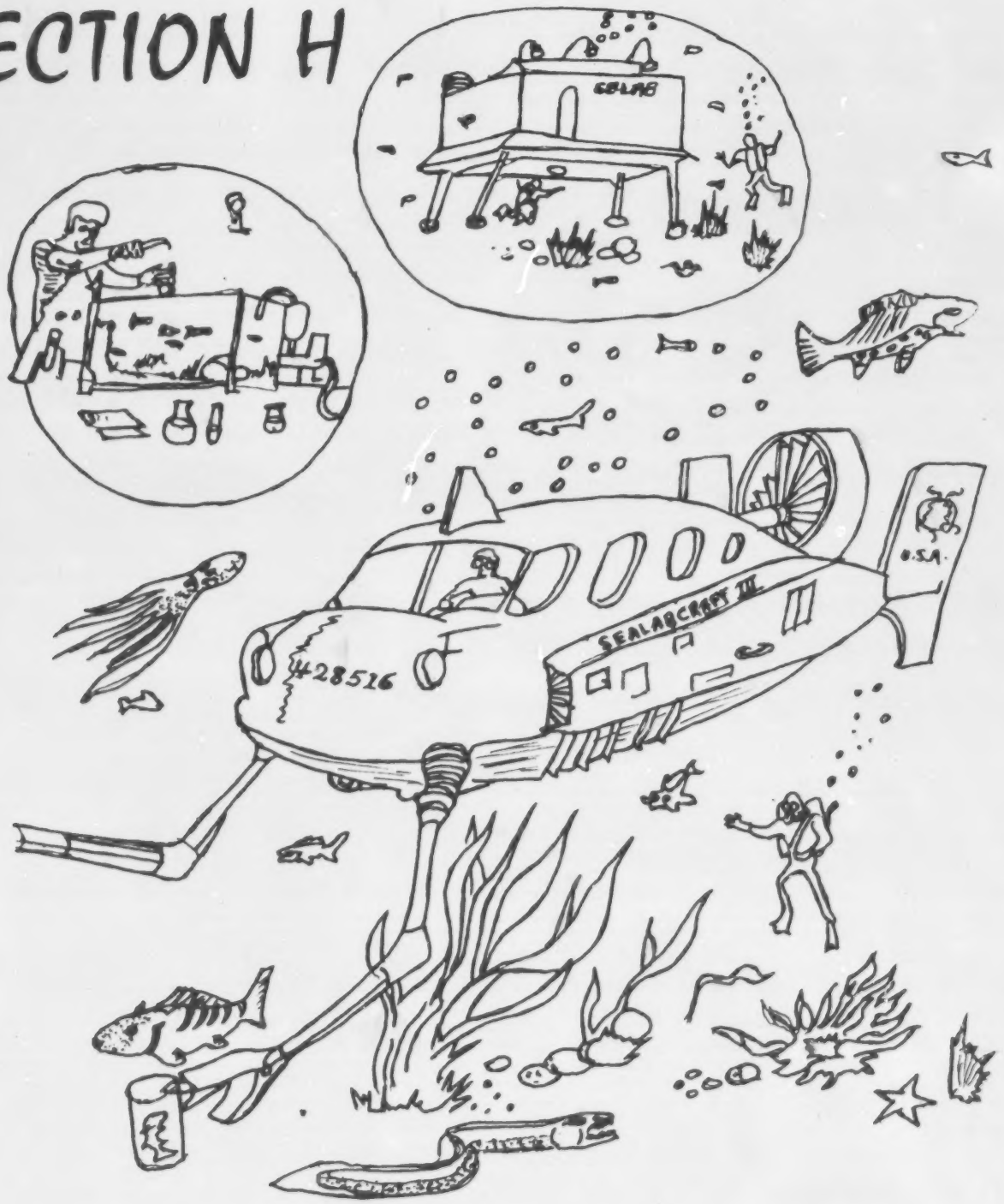
Books Available in the Library

Guarding the Treasured Lands	Ann Sutton Lippincott. 1965
Careers in Natural Resource Conservation	Fred W. Herbert Walck, H. Z. 1965
Conservation	Ed Dodd Crowell-Collier. 1971

CAREER INFORMATION FOR YOUR FIELDS OF INTEREST

Get recent books and magazines from public or school library.
Go to see the State Employment Offices.
Visit places of work.
Know your Social Security Number and Laws of U. S. Department of Labor.
Practice writing letters of application. Keep your resume up to date.
Do volunteer work.
Keep up with changes in the working world.
Attend classes in careers and related subjects.
Interview friends, relatives, neighbors, civic, and business leaders.
Clip newspaper articles and want ads.
See films on careers.
Make your own visual aids.
Join clubs. Find hobbies and crafts that tie in with your interests.
Send for government bulletins and information from schools and business leaders.

SECTION H



MARINE SCIENCE OCCUPATIONS

CLASSROOM PRESENTATION OF THE CONCEPTS AND PROCEDURES OF MARINE SCIENCE CAREERS

I. Behavioral Objectives

Eighty percent of students will name and describe five marine science occupations and the predicted needs of these careers for the next ten years. They will also list three qualifications and sources of information for involvement in this career.

II. Instructional Procedures

Students will be directed to prepare or participate in two or more of the suggested activity projects. The individual's interest and ability should be considered in making assignments. A hand-out sheet of the 21 suggested activities should be distributed to each student the first day of the Marine Science introduction. If the student is vitally interested in this field, he should be allowed to continue working on it even after the four-day investigation period for Marine Science has ended. Of course, he will have to move on into the next field for class participation, but he should not be required to do activities outside class in the new field if Marine Science is one of his choices for a career. The student activities for this field are on the following page.

STUDENT ACTIVITIES RELATING TO MARINE SCIENCE CAREERS

Each student will prepare or participate in two or more of the following:

1. Interview an on-the-job worker; include likes and dislikes of the job.
2. Take notes on class speakers, audiovisual aids, and printed materials.
3. Collect pictures and articles for a scrapbook.
4. List names of people, their companies, and phone numbers that will be helpful with resource information.
5. Write three to five pages on a research paper. You may include technical books, fiction, and/or biographies. Choose one of the following topics:
   a. "Food from the Sea"
   b. "Minerals from the Sea"
   c. "Medicine from the Sea"
6. Write one or more business letters requesting information and thanking resource assistants.
7. Prepare a map of present or future Marine Science explorations.
8. Develop and utilize media materials.
9. Participate in an improvisational skit in one of the following:
   a. Interviewing applicants
   b. Collecting specimen
   c. Researching information
   d. Rescuing divers
   e. Servicing companies
10. Write instructions and direct class in one of the following:
    a. Charades (Marine Careers)
    b. Crossword puzzles (Marine tools)
    c. Scrabble for Marine Science
11. Design the breathing apparatus for scuba diving.
12. Demonstrate first aid for water victims.
13. Build an aquarium.
14. Collect and identify five or more objects in one of the following groups:
    a. Shells
    b. Marine plants
    c. Marine animals

15. Grow two or more underwater plants or animals for display.

16. List predictions for Marine Science careers in the next ten years. Choose from one or more of the following fields:

    a. Recreation
    b. Research
    c. Production (off-shore)
    d. Services

17. Be a guide on an imaginary exploration.

18. List tools needed in various marine jobs.

19. Take a field trip to one or more of the following places:

    a. Sea Arama
    b. Galveston Beach
    c. Oceanography Center (Westbury High School campus)

20. Use shells or dried plant life in a table arrangement.

21. Make a lamp or other useful object with driftwood.

III. Performance goals

A. Involvement in marine-related clubs
   1. Science club at school
   2. Houston Underwater Club, 4010 S. Braeswood
   3. Underwater Society of America, 427 Chestnut St., Philadelphia, Pennsylvania 19106
   4. American Society for Oceanography, 854 Main Bldg., Houston, Texas 77002

B. Extension of hobbies
   1. Shell collections
   2. Aquarium projects
   3. Photography

C. Improvement of water skills
   1. YMCA
   2. Red Cross
   3. Scouts
   4. Private schools

D. Library Research

IV. Evaluation

A. Oral and written participation on the projects suggested under Instructional Procedures

B. Involvement in hobbies and skills listed in performance goals

C. Check for summation of activities on career information wheel

D. Improvisational group studies in Marine Science job situation

FLEXIBLE LESSON PLANS
(approximately four days)

First Day—Introduction

Teacher

Poster
Library books, magazines, pamphlets
Slide and tape presentation by M. E. Schell
Transparencies by M. E. Schell
Hand out list of activities, Interdependence List for Marine Science, and Career Information for Your Fields of Interest

Students

Add specific employment names and addresses as directed on TR III.
Begin projects listed in instructional procedure.

Second Day—Resource Speaker

Call Speakers' Bureau of Houston Underwater Club—464-1010.

Third Day—Slides of Underwater Photography

(Reprints—Dr. H. Reuter and Mr. L. Evans)
Students follow up with creative work in art, music, poetry, photography, craft, collection, or research.

Fourth Day—Involvement

Two-minute presentation from each student (projects listed first day)
Twenty minutes for improvisation of a case study dealing with a Marine Science employee. Teacher will divide class into three groups to act as personnel consultants. Give a case study of applications submitted for:

Research scientist—Group 1
Tender—Group 2
Clerk—Group 3

APPENDIX

1. Interdependence Chart
2. H.E.W. Chart
3. Stories, Data, Activities*
4. Want Ads
5. Predictions
6. Resources
   a. Study tours
   b. Speakers
   c. Media
   d. Printed Materials
7. Summation Wheel

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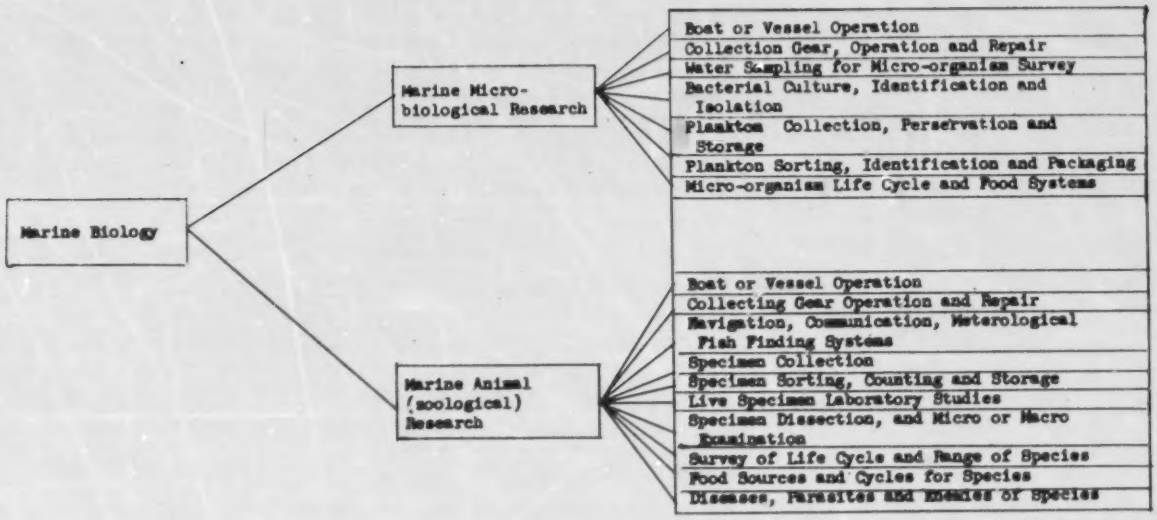
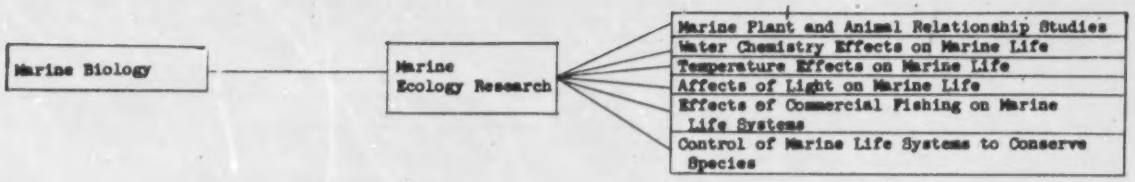
*This may vary with specific subjects in the different careers

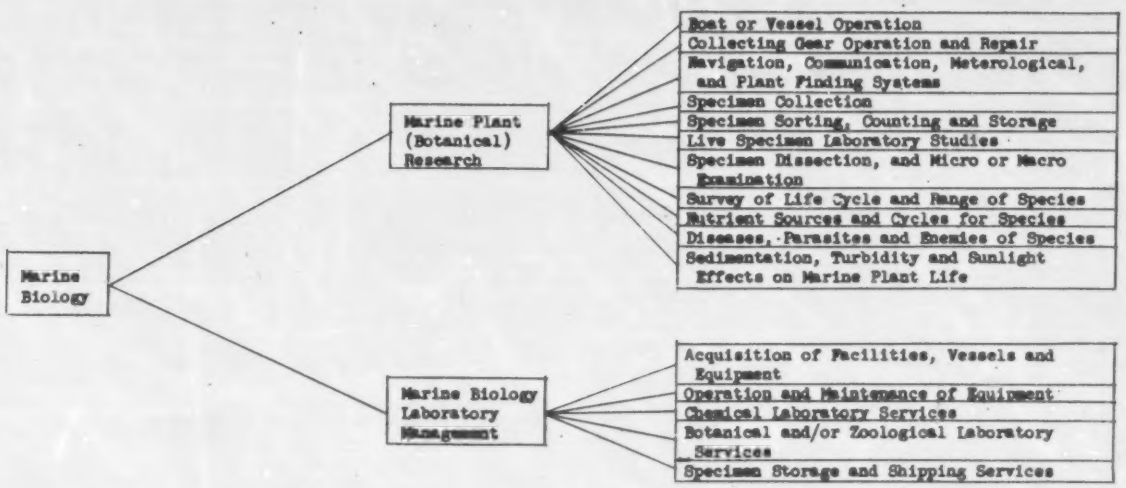
MARINE SCIENCE — Interdependence — Examples of a Few People and Places

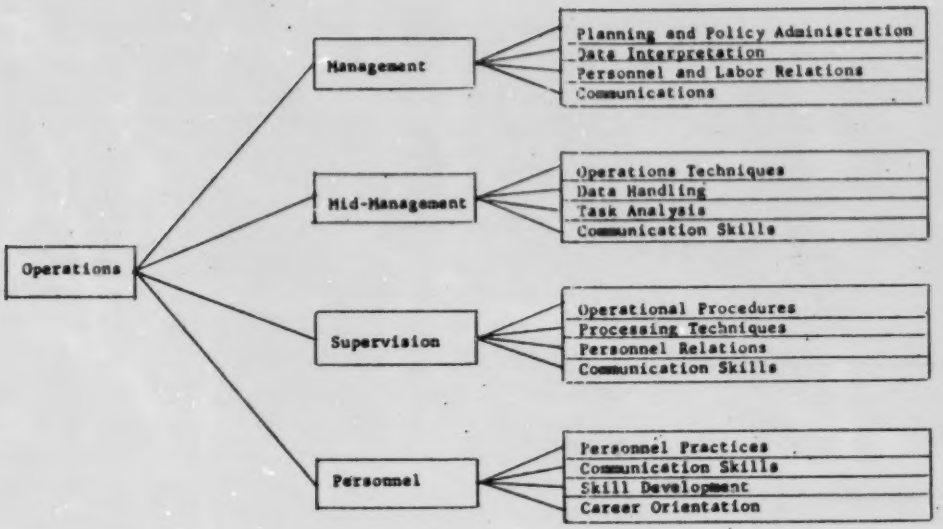
Projected Needs	Careers	Places of Employment
Recreation Why? More leisure time with 4-day week	Excursion directors Merchandising personnel Salesmen Instructors Writers and photographers	Travel agencies Dive and other sport shops Social organizations Private diving schools Publishing houses
Research Why? Food Space Medicine Behavioral problems Environmental Control	Physicians Geologists Chemists Botanists Zoologists Archeologists Physicists Psychologists	Hospitals Oil company laboratories Museum development centers Government offices Schools Navy
Production Why? Oil from offshore rigs as land supply decreases.	Welders Pipefitters Electronic technicians Engineers Tenders Surveyors Blasting technicians	Construction companies Oil companies Salvage companies Chemical companies
Transportation Why? Marine Service is predicted to increase 80 to 100 percent in next decade.	*Operational* Building crew Repair crew Deck Hands Pilots Captains *Traffic* Advertising Salesmen Rate makers Dispatchers Clerks	Marine service companies Ship yard

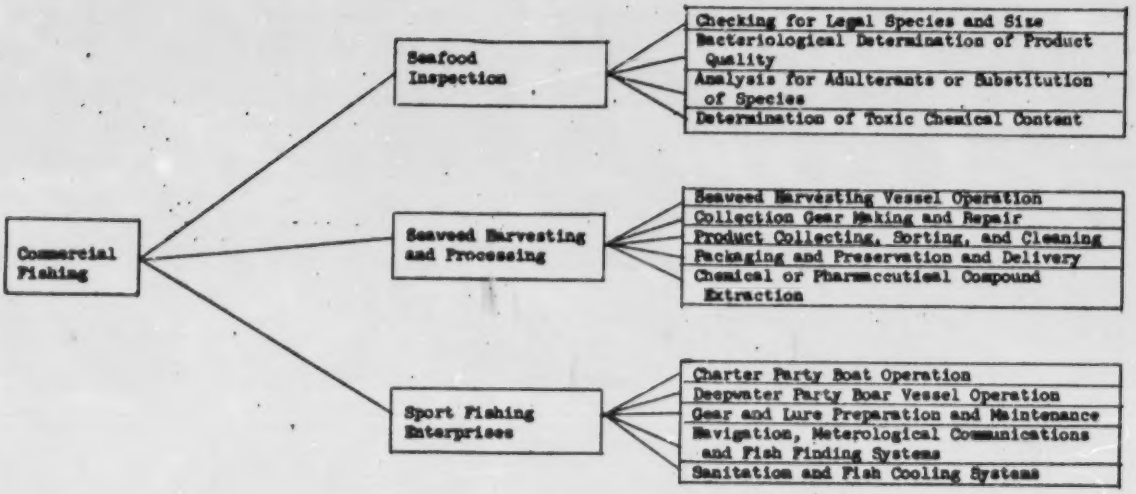
CLUSTER FOR MARINE SCIENCE

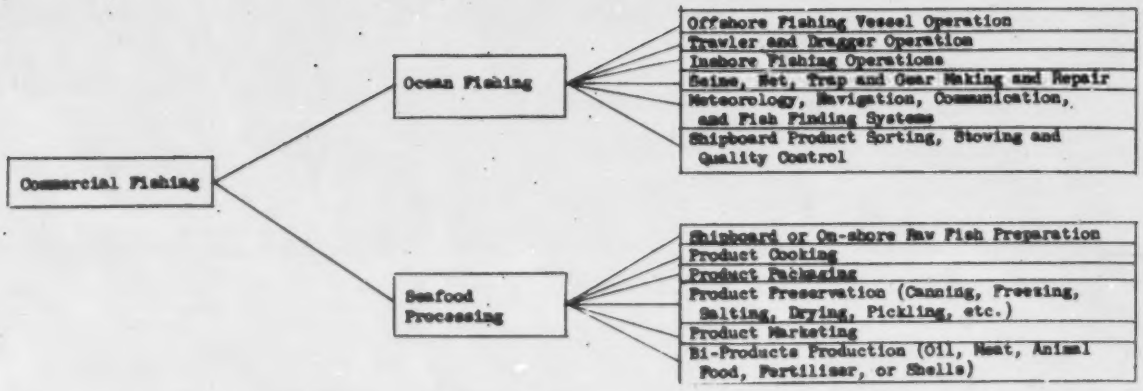

Marine Biology
Marine Micro-biological Research
Boat or Vessel Operation
Collection Gear, Operation and Repair
Water Sampling for Micro-organism Survey
Bacterial Culture, Identification and Isolation
Plankton Collection, Perservation and Storage
Plankton Sorting, Identification and Packaging
Micro-organism Life Cycle and Food Systems
Marine Animal (zoological) Research
Boat or Vessel Operation
Collecting Gear Operation and Repair
Navigation, Communication, Meterological Fish Finding Systems
Specimen Collection
Specimen Sorting, Counting and Storage
Live Specimen Laboratory Studies
Specimen Dissection, and Micro or Macro Examination
Survey of Life Cycle and Range of Species
Food Sources and Cycles for Species
Diseases, Parasites and Enemies of Species

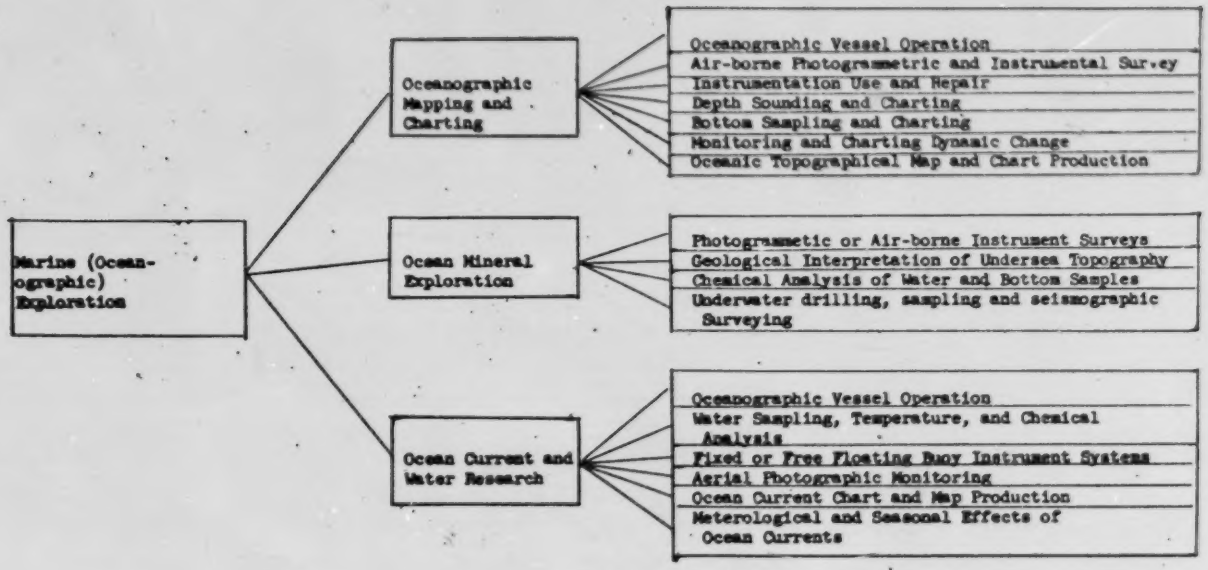

Marine Biology
Marine Ecology Research
Marine Plant and Animal Relationship Studies
Water Chemistry Effects on Marine Life
Temperature Effects on Marine Life
Affects of Light on Marine Life
Effects of Commercial Fishing on Marine Life Systems
Control of Marine Life Systems to Conserve Species

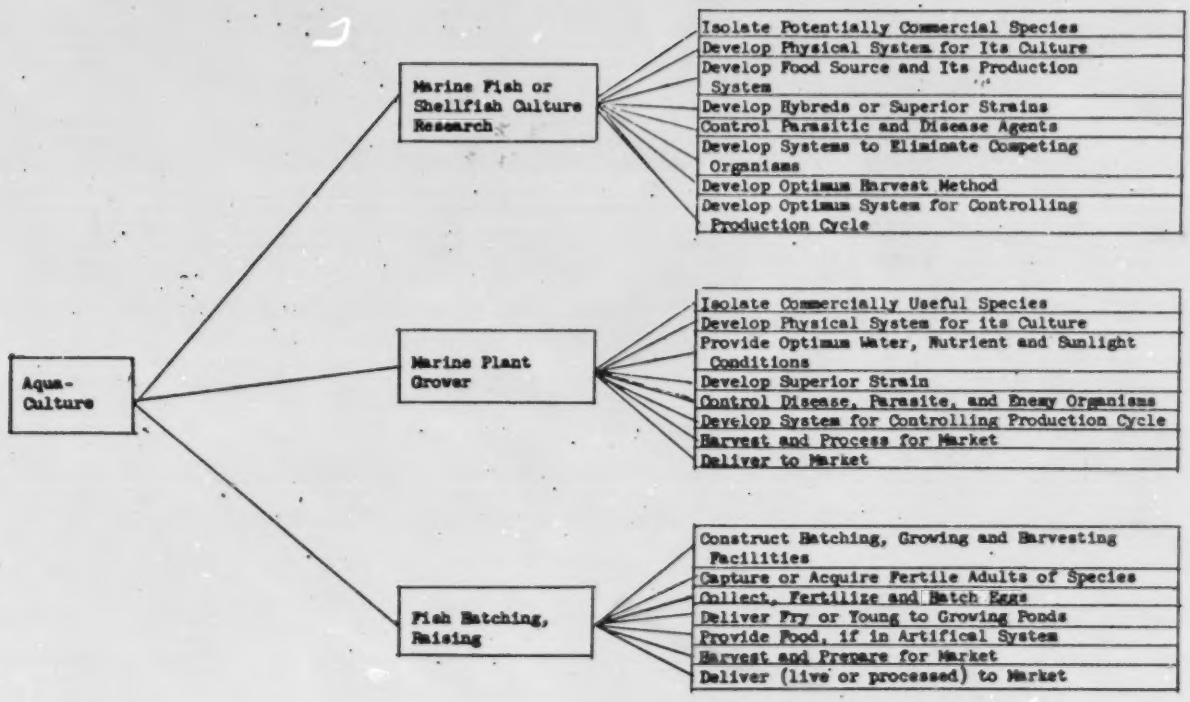

Marine Biology
Marine Plant (Botanical) Research
Boat or Vessel Operation
Collecting Gear Operation and Repair
Navigation, Communication, Meterological, and Plant Finding Systems
Specimen Collection
Specimen Sorting, Counting and Storage
Live Specimen Laboratory Studies
Specimen Dissection, and Micro or Macro Examination
Survey of Life Cycle and Range of Species
Nutrient Sources and Cycles for Species
Diseases, Parasites and Enemies of Species
Sedimentation, Turbidity and Sunlight Effects on Marine Plant Life
Marine Biology Laboratory Management
Acquisition of Facilities, Vessels and Equipment
Operation and Maintenance of Equipment
Chemical Laboratory Services
Botanical and/or Zoological Laboratory Services
Specimen Storage and Shipping Services

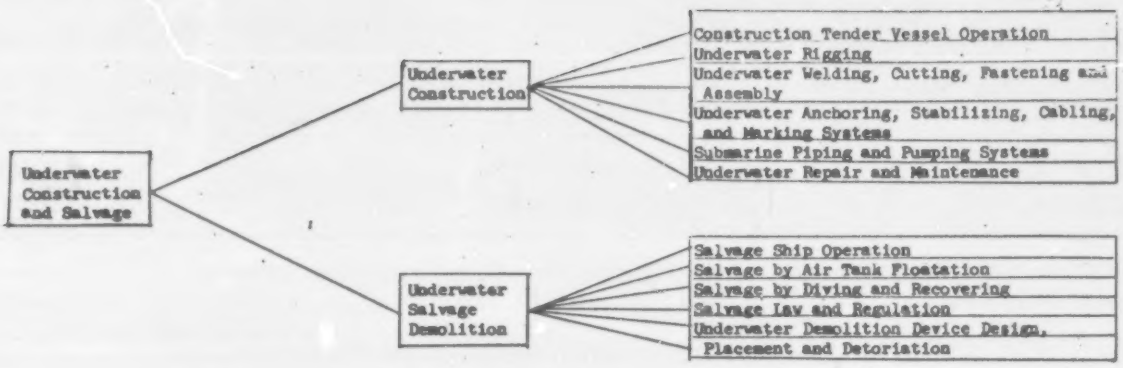

Operations
Management
Planning and Policy Administration
Data Interpretation
Personnel and Labor Relations
Communications
Mid-Management
Operations Techniques
Data Handling
Task Analysis
Communication Skills
Supervision
Operational Procedures
Processing Techniques
Personnel Relations
Communication Skills
Personnel
Personnel Practices
Communication Skills
Skill Development
Career Orientation

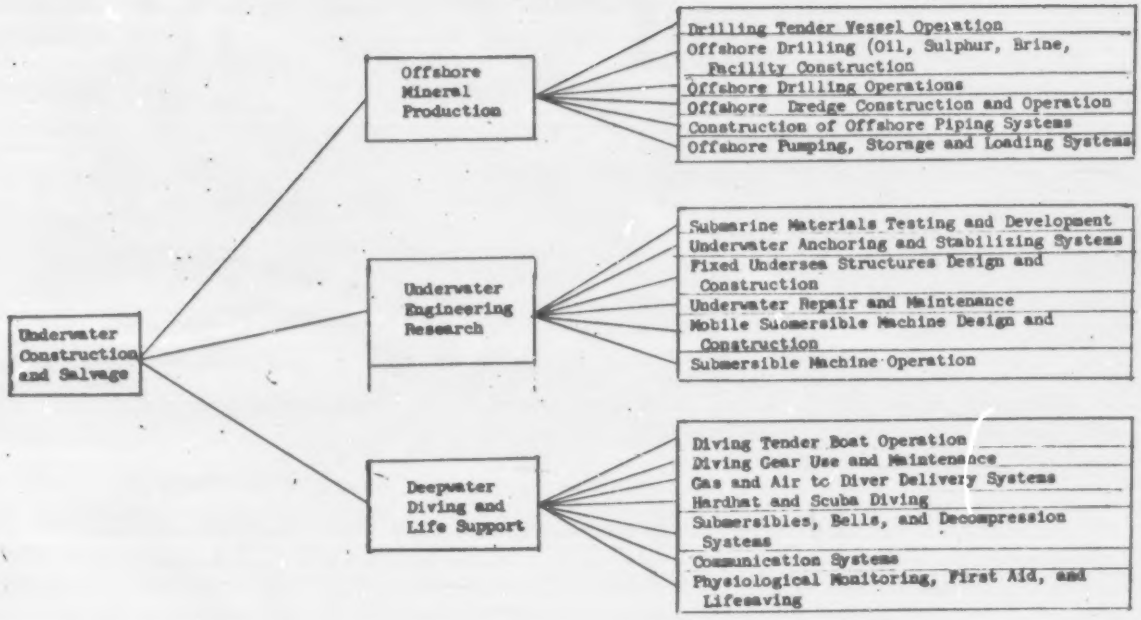

Commercial Fishing
Seafood Inspection
Checking for Legal Species and Size
Bacteriological Determination of Product Quality
Analysis for Adulterants or Substitution of Species
Determination of Toxic Chemical Content
Seaweed Harvesting and Processing
Seaweed Harvesting Vessel Operation
Collection Gear Making and Repair
Product Collecting, Sorting, and Cleaning
Packaging and Preservation and Delivery
Chemical or Pharmaceutical Compound Extraction
Sport Fishing Enterprises
Charter Party Boat Operation
Deepwater Party Boat Vessel Operation
Gear and Lure Preparation and Maintenance
Navigation, Meterological Communications and Fish Finding Systems
Sanitation and Fish Cooling Systems


Commercial Fishing
Ocean Fishing
Offshore Fishing Vessel Operation
Trawler and Dragger Operation
Inshore Fishing Operations
Seine, Net, Trap and Gear Making and Repair
Meteorology, Navigation, Communication, and Fish Finding Systems
Shipboard Product Sorting, Stowing and Quality Control
Seafood Processing
Shipboard or On-shore Raw Fish Preparation
Product Cooking
Product Packaging
Product Preservation (Canning, Freezing, Salting, Drying, Pickling, etc.)
Product Marketing
Bi-Products Production (Oil, Meal, Animal Food, Fertilizer, or Shells)


Marine (Oceanographic) Exploration
Oceanographic Mapping and Charting
Oceanographic Vessel Operation
Air-borne Photogrammetric and Instrumental Survey
Instrumentation Use and Repair
Depth Sounding and Charting
Bottom Sampling and Charting
Monitoring and Charting Dynamic Change
Oceanic Topographical Map and Chart Production
Ocean Mineral Exploration
Photogrammetic or Air-borne Instrument Surveys
Geological Interpretation of Undersea Topography
Chemical Analysis of Water and Bottom Samples
Underwater drilling, sampling and seismographic Surveying
Ocean Current and Water Research
Oceanographic Vessel Operation
Water Sampling, Temperature, and Chemical Analysis
Fixed or Free Floating Buoy Instrument Systems
Aerial Photographic Monitoring
Ocean Current Chart and Map Production
Meterological and Seasonal Effects of Ocean Currents


Aqua-Culture
Marine Fish or Shellfish Culture Research
Isolate Potentially Commercial Species
Develop Physical System for Its Culture
Develop Food Source and Its Production System
Develop Hybreds or Superior Strains
Control Parasitic and Disease Agents
Develop Systems to Eliminate Competing Organisms
Develop Optimum Harvest Method
Develop Optimum System for Controlling Production Cycle
Marine Plant Grower
Isolate Commercially Useful Species
Develop Physical System for its Culture
Provide Optimum Water, Nutrient and Sunlight Conditions
Develop Superior Strain
Control Disease, Parasite, and Enemy Organisms
Develop System for Controlling Production Cycle
Harvest and Process for Market
Deliver to Market
Fish Hatching, Raising
Construct Hatching, Growing and Harvesting Facilities
Capture or Acquire Fertile Adults of Species
Collect, Fertilize and Hatch Eggs
Deliver Fry or Young to Growing Ponds
Provide Food, if in Artifical System
Harvest and Prepare for Market
Deliver (live or processed) to Market


Underwater Construction and Salvage
Underwater Construction
Construction Tender Vessel Operation
Underwater Rigging
Underwater Welding, Cutting, Fastening and Assembly
Underwater Anchoring, Stabilizing, Cabling, and Marking Systems
Submarine Piping and Pumping Systems
Underwater Repair and Maintenance
Underwater Salvage Demolition
Salvage Ship Operation
Salvage by Air Tank Floatation
Salvage by Diving and Recovering
Salvage Law and Regulation
Underwater Demolition Device Design, Placement and Detoriation


Underwater Construction and Salvage
Offshore Mineral Production
Drilling Tender Vessel Operation
Offshore Drilling (Oil, Sulphur, Brine, Facility Construction
Offshore Drilling Operations
Offshore Dredge Construction and Operation
Construction of Offshore Piping Systems
Offshore Pumping, Storage and Loading Systems
Underwater Engineering Research
Submarine Materials Testing and Development
Underwater Anchoring and Stabilizing Systems
Fixed Undersea Structures Design and Construction
Underwater Repair and Maintenance
Mobile Submersible Machine Design and Construction
Submersible Machine Operation
Deepwater Diving and Life Support
Diving Tender Boat Operation
Diving Gear Use and Maintenance
Gas and Air to Diver Delivery Systems
Hardhat and Scuba Diving
Submersibles, Bells, and Decompression Systems
Communication Systems
Physiological Monitoring, First Aid, and Lifesaving

A FLASH IN THE DEPTHS

Some people drop out and go under ground. Larry Evans was at Rice working on a Ph.D. in chemical engineering when he "dropped out" and went underwater. His underwater photography is now winning prizes in major underwater film festivals.

Larry Evans had everthing planned. He came to Houston to work on a Ph.D. in chemical engineering at Rice. The studies were hard, but that went with what he wanted out of life.

As a diversion to his studies he took up scuba diving and underwater photography. That diversion now threatens to become his career.

After winning a first, two seconds, and one third place in black and white and color competition at last year's Houston International Film Festival, and being hired as director of research and development for a Houston firm specializing in diver training and education, Evans seems to be well on his way to a career undersea. Besides the local festival, he also won prizes at the Hawaii Film Festival, considered the most prestigious, and other festivals.

He entered more of his photography in this year's film festival, which is part of Seaspace '72 being staged Saturday and Sunday by the Houston Underwater Club at the Sheraton Lincoln. But it is the other part of the program that has Evans excited. The symposium.

"When you say symposium, most people say 'But that's technical.' Well maybe. Usually. But this one will be entertaining in addition to teaching everything you need to know about the equipment and training necessary to take up scuba diving or underwater photography — as a sport or career," says Evans.

It's not such a long road to becoming good. Evans, who just four years ago was a student, is currently finishing his first underwater documentary. It features Dr. John Warme, professor of geology at Rice, and Warme's work in bio-erosion.

"I am most interested in the ecology of the reefs," says Evans. That interest has taken him to the coral reefs and formations in the Caribbean, off Jamaica and the Bahamas, and in the Gulf of Mexico off Yucatan and the Texas coast.

Evans shuns sports fishing with spear guns. "I would rather photograph a fish than spear it," he says.

And what about sharks?

"Oh, there are documented instances of shark attacks, but the odds against a diver being attacked are astronomical," says Evans. "Man causes more problems for himself under water than do sharks or other fish."

Houston Chronicle–Texas Magazine
November 12, 1972

She's Glad He's Taking Up Diving

Because There's Not Much Room for Advancement in Alligator Wrestling

BY BRENDA BEUST SMITH

Chronicle Staff

PAULA ANDRESAKIS sometimes accuses her husband Bobby of marrying her so he can get free medical attention.

When you're a nurse, and your husband's an alligator wrestler, that's not as farfetched as some people might suppose.

Or rather, has been an alligator-wrestler.

Bobby's trading in his alligator-proof pants for a deep-sea diving suit, and Paula doesn't know whether to rejoice or moan.

The tall, slender blonde is sitting high atop the thatch-covered bleacher at Sea-Arama, watching Bobby prepare for his alligator-snake show.

Consider yourself lucky to see her up here. She seldom attends. And when she does, she warns you, she doesn't watch much of the show.

"Isn't it funny? It never bothered me to watch before I met him. Now I just can't take it."

Especially the snakes. Bobby will be working with three cobras, and numerous rattlesnakes, all as deadly as the day they were captured. He's been bitten three times in the six months they've been married. And recalling those times, Paula can't help smiling a little.

"It's really not funny. I shouldn't laugh. But almost everytime a snake has bitten Bobby, the snake has died. One within four hours!"

Bobby is trading professions, she says, trying to be more serious, "because there really isn't much future in alligator wrestling. I mean, like he said, who wants to be a 45-year-old alligator wrestler?"

The show starts and the announcer introduces Bobby, a muscular, good-looking guy in a rugged, outdoors sort of way. He is one of several alligator-wrestlers at Sea-Arama.

Paula watches the first antics with little Alvin, a small alligator which, she says, is the only trained one in the world. Bobby trained him.

Did he do it at home?

"No sir! We had an understanding before we were married. I'd go over to his apartment and he'd have all these snakes and things there. One day one got loose and I said either I go or those snakes go."

Fortunately, she muses, Bobby decided the snakes could go.

He doesn't bring alligators home either. Just an African lion cub he was taming for someone, a fawn and four or five baby racoons that they nursed on bottles.

All this is in their Houston apartment. They've bought several acres in Hitchcock, so the dogs, horse and "whatever else he decides to bring home" can have more room.

HOUSTON CHRONICLE
August 6, 1972

Turtle Growth Study Aimed At Gourmets

Honolulu (AP) — The sea is a potential source of nourishment for the world's hungry millions, but a University of Hawaii marine biologist is working to please the palates of gourmets, too.

George Balazs of the Hawaii Institute of Marine Biology is studying 130 green sea turtle hatchlings, to find out what the tasty turtles eat and how long it takes them to grow to platter size.

"Initially, we would only be able to supply turtles for the gourmet market," Balzs said, "but later on it may have a potential for the mass market."

The green sea turtle is prized for its veal-like flesh, its calipee cartilage that produces the sticky texture demanded of the best turtle soup and its flippers, which make stew.

Balazs is feeding the two-inch-long hatchlings varying diets of vegetable matter to determine the optimum amounts of protein and calories. One group gets a meat diet.

The one-ounce hatchlings must grow to about 150 pounds before they're ready for market.

Before turtle farming becomes a reality, the turtles must prove they will breed on artificial beaches. And Balazs' initial experiments have not been encouraging.

Three nests of turtle eggs were transplanted from the French Frigate Shoals, in the western part of the Hawaiian island chain, to a small island near Honolulu. Two nests were not fertile, and only eight turtles hatched from the 76 fertile eggs.

In the wild, about half the eggs normally hatch, Balazs said.

Balazs said the five days moving time from the shoals to Honolulu may have arrested the development of the eggs. So he plans to bring more eggs to Honolulu with the moving time cut to one day.

SCUBA DIVERS FISH GUNS FROM IDAHO'S SNAKE RIVER

Payette, Idaho (AP) — Scuba divers who say the Snake River is paved with shotguns will fish your firearm out of the stream for $60 a day.

Stan McNutt, Payette city administrator and leader of the divers, said hunting season is the best time of the year for professional divers in the Snake River.

Hunters whose boats upset usually escape safely to shore, but lose their valuable firearms.

The divers say they'll dive regardless of the temperature of the water. Last winter, they retrieved hunters' guns in the middle of a snowstorm.

The divers say guns can lie on the river bottom for up to six weeks and still be functional. After that, they begin to corrode.

Sometimes a skill leads to a job that is very different from the ones that were planned. Be ready to branch out into new uses for your talents and skills. As changes occur, try to see the new needs for products and services. The basis for wise predictions in career fields is the awareness of supply and demand.

Give examples of supplies and demands that you believe will exist in 1980.

Houston Chronicle, November 15, 1972

Doctor Finds Undersea Paradise

By BRUCE SPINKS
Post Sports Writer

Dr S. Harold Reuter is a SCUBA diver. That's as in Self-Contained Underwater Breathing Apparatus.

Reuter is also a prominent Houston physician but since he became associated with the aquatic sport he spends as much time in diving gear as in the surgeon's gown.

Reuter, who holds degrees from the University of Connecticut, Brown, and Harvard Medical School, is the current president of the Houston Underwater Club and has won numerous awards for his underwater photography including a first place in the International Underwater Film Contest and Festival in California for the slide "Feather Dusters."

For the next two weeks, Dr Reuter will deliver a series of lectures on Scuba diving, underwater photography and underwater adventures in the Caribbean in conjunction with Joske's tribute to "The Sea." The tribute opens Monday at the Post Oak store, headquarters for the event.

In addition to a "Walk Through the Bottom of the Sea" motif on the third floor and an exhibit of shells and coral of the Houston Concology Society on the fourth floor, Joske's Post Oak store will also display a large part of Reuter's underwater photographs.

However, Reuter's Monday lecture will be delivered at Joske's Northline store in the assembly hall. He will deliver another lecture at Northline Thursday. All lectures begin at 7 PM.

On April 21st and April 24th, he talks at the Gulfgate store and on April 18th and 25th at Post Oak in the sporting goods department.

Last year, the Houston Underwater Club named Reuter diver of the year. Recently, he was elected president of the 125-member organization.

"It is my prime objective as president," says Reuter, "to make information available that will help in making SCUBA diving the safe sport it can be with proper instruction.

"Really," Reuter analyzes, "SCUBA diving is not anymore dangerous than crossing Main Street or going hunting. The most dangerous aspect of diving is going without proper instruction or without taking certified courses."

Members of the club must be certified divers. In other words, they can take a 10-week course at the downtown YMCA or the Dad's Club. The course costs $25 and then $12 a year for membership in the Houston Underwater Club.

There are other dangers, however. Like the dreaded Sharks and the Portuguese Man O'War. But in many instances the deadly creatures will not attack unless agitated.

"I get as much enjoyment out of SCUBA diving as others get out of baseball or golf," says Reuter. "This is my sport. Its another world, and I can completely relax when I dive and too, the future depends very much on underwater life."

In addition to trips to the Caribbean, membership in the club includes regular meetings with speakers, fish fries, shrimp boils, Bar-B-Qs, contests and banquets.

Another objective of Reuter during his term as president is to set up a speaker's bureau to provide speakers for other such organizations.

DR S. HAROLD REUTER IN SCUBA DIVING GEAR
Lectures During Joske's Salute to 'The Sea'

"No-Calculation" Dive Tables

Simplified Linear System for Repetitive Scuba Dives

by

S. Harold Reuter, M.D.
Houston, Texas

(For Decor Models PNT, DNT, SNT, and UNT)

Instructions For Use

For a "No-Decompression" Dive:

1. Find the depth you have dived along the top of Table 1-11.
2. Drop down to the figure which denotes your Bottom Time.
3. Go across to the right to Table 1-12.
4. Follow the arrow upward until you find the time spent out of the water since the last dive (Surface Interval).
5. Go across to the right to find the allowable Bottom Time (white numbers) for the next dive. These are listed under the appropriate depths at the top of each column.
   The Black Numbers are "Residual Nitrogen Times" and are only important for figuring "Decompression Dives"
6. If the "no-decompression" limits are exceeded, go to Table 1-10 for Decompression stops and times.

Use of Table 1-10:

1. All decompression stops are timed in minutes.
2. Ascent rate is 60 feet per minute.
3. The chest level of the diver should be maintained as close as possible to each decompression depth for the number of minutes listed.
4. The time at each stop is the exact time that is spent at that decompression depth.

Definitions:

1. **Bottom Time:** (in minutes) starts when the diver leaves the surface and ends only when the diver starts a direct ascent back to the surface.
   Always select the exact or next greater bottom time exposure.
2. **Depth:** (in feet) is the Deepest depth of descent.
   Always enter the tables on the exact or the next greater depth reached.
3. **Residual Nitrogen Time:** is Time in minutes that a diver is to consider he has already spent on the bottom when he starts a repetitive dive.
4. **Surface Interval:** time (in hours and minutes) actually spent on the surface between dives.
5. **Repetitive Dive:** is a dive begun within 12 hours of surfacing from a previous dive.

Examples

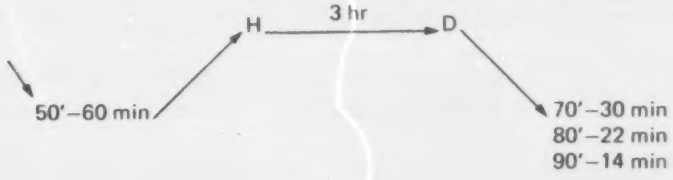
There are four basic problems for which the U.S. Navy dive tables can provide answers. The "No-Calculation" Linear System can solve these problems very simply and quickly.

Let us consider a hypothetical diver who descends to 50 feet remaining at that depth for 60 minutes (Bottom Time). He then returns to the surface for three hours (Surface Interval) before starting his next dive.

A. FIRST REPETITIVE DIVE (Second Dive)

What will be his allowable Bottom Time for a No-Decompression Dive if he wishes to dive to 70 feet on his first Repetitive Dive (second dive)?

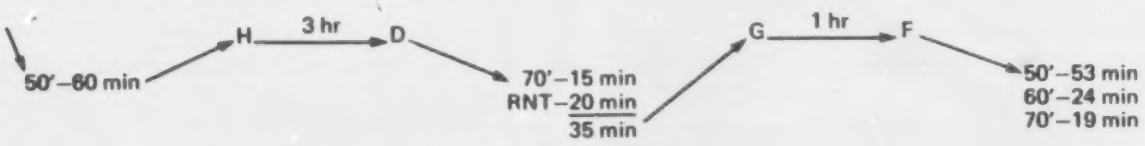
1. Drop down the 50 foot column in Table 1-11 to the 60 minute line.
2. Go across to the right to Table 1-12 ("H" Repetitive Group).
3. Follow the arrow upward until reaching the limits within which three hours falls (2:24 to 3:20).
4. Go across to the right ("D" Repetitive Group) to the 70 foot column where the Bottom Time limit is found to be 30 minutes (White Number–Black Background).
   This is the maximum time that can be spent without having to make Decompression Stops.
   If less time was spent, proceed to Example B.
   If more time was spent, proceed to Example C.



B. SECOND REPETITIVE DIVE (Third Dive)

If the Repetitive Dive was made to 70 feet for only 15 minutes Bottom Time instead of the maximum 30 minutes allowed, how would the tables be used to determine the next Repetitive Dive (third dive)?

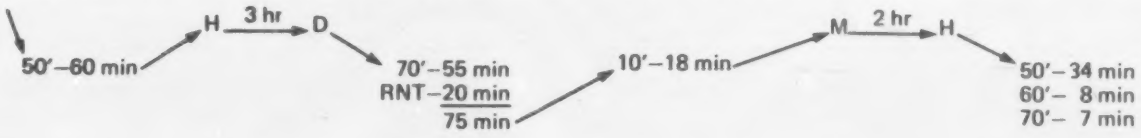
1. Add the 15 minutes Bottom Time used on the second dive to the 20 minutes Bottom Time which is the time that a diver is to consider that he has already spent at 70 feet when he *starts* the second dive (Residual Nitrogen Time)–totaling 35 minutes.
   This Residual Nitrogen Time (20 minutes) is shown in Black figures above the Bottom Time limits in White figures (30 minutes).
2. Returning to Table 1-11, drop down the 70 foot column to 35 minutes.
3. Go across to the right to enter the Surface Interval Credit Table as a "G" Diver.
4. Suppose 1 hour was now spent on the surface.
5. Follow the arrow after "G" upward until reaching the limits within which 1 hour falls (0:41 to 1:15).
6. Go across to the right to become an "F" Diver.
7. If the next dive were made to 50 feet, the maximum No-Decompression Bottom Time would be 53 minutes (White Number–Black Background). For a 60 foot dive, 24 minutes or 70 foot dive, 19 minutes.



C. DECOMPRESSION REPETITIVE DIVE

How does the diver determine his Decompression Stops if he finds his Bottom Time at 70 feet is 55 minutes instead of the maximum 30 minutes allowed?

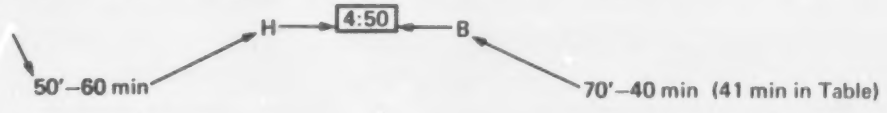
1. Add the 55 minutes Bottom Time used on the second dive to the 20 minutes Bottom Time which is the time that a diver is to consider he has already spent at 70 feet when he *starts* the second dive (Residual Nitrogen Time)—totaling 75 minutes.
2. Go to Table 1-10 Standard Air Decompression Table.
3. In the Depth Column locate 70 feet.
4. Go across to the right, in the 80 minute line (exact or next greatest Bottom Time) to find that a 18 minute Decompression Stop is necessary at 10 feet.
5. The letter next to 18 is "M" which indicates a new Repetitive Group Designation following decompression.
6. Suppose 2 hours were now spent on the surface.
7. Enter Table 1-12 following the arrow after "M" upward until reaching the limits within which 2 hours falls (1:40 to 2:05).
8. Go across to the right to become an "H" Diver.
9. If the next dive were made to 50 feet, the maximum No-Decompression Bottom Time would be 34 minutes (White Number—Black Background). For a 60 foot dive, 8 minutes or 70 foot dive, 7 minutes.



D. SURFACE INTERVAL FOR NO-DECOMPRESSION REPETITIVE DIVE

Suppose the diver wishes to go to 70 feet for this first Repetitive Dive (second dive) for a Bottom Time of 40 minutes without the necessity of decompression stops? The proper Surface Interval must now be determined.

1. Enter Table 1-11 at the 50 foot column dropping down to 60 minutes (as in problem A).
2. Go across to the right to find the Repetitive Group which is "H".
3. Leave this table remembering the Group Designation and go to Table 1-13 in the 70 foot column.
4. Dropping down to the exact Bottom Time desired (40 minutes), or the next greater, stop at the 41 minute Bottom Time limit line which is in the "B" Group line.
5. Go to the left until the "H" column is reached. The minimal Surface Interval for a No-Decompression Dive is found to be 4 hours and 50 minutes.



Plan Your Dive – Dive Your Plan

Always carry the Dive Tables on a dive – they may save your life.

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DNT-68-1 (Revised 9-72)

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"NO CALCULATION DIVE TABLES" Simplified Linear System for Repetitive Scuba Dives

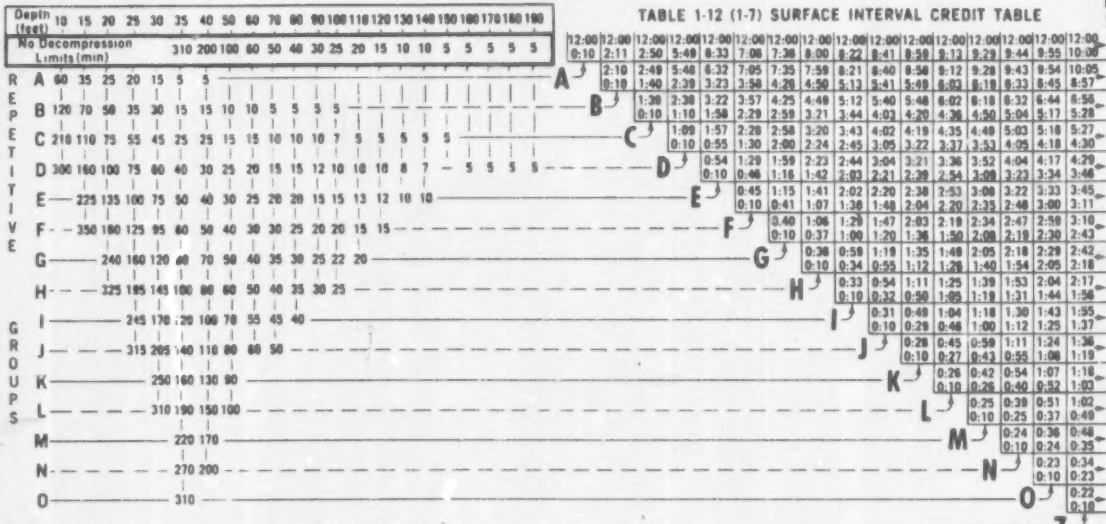

TABLE 1-11 (1-6) No Decompression Limits and Repetitive Group Designation Table for No Decompression Air Dives

U.S. Navy Dive Tables Modified for the Sport Diver

TABLE 1-12 (1-7) SURFACE INTERVAL CREDIT TABLE

	12:00 0:10	12:00 2:11	12:00 2:50	12:00 5:49	12:00 8:33	12:00 7:08	12:00 7:38	12:00 8:00	12:00 8:22	12:00 8:41	12:00 8:58	12:00 9:12	12:00 9:29	12:00 9:44	12:00 9:55	12:00 10:05
A	2:10 0:10	2:10 1:40	2:49 2:39	5:48 3:23	6:32 3:58	7:05 4:28	7:35 4:50	7:58 5:13	8:21 5:41	8:40 5:59	8:58 6:03	9:12 6:18	9:28 6:33	9:43 6:45	9:54 8:57	10:05
B	1:38 0:10	2:38 1:10	3:22 1:58	3:57 2:29	4:25 2:59	4:49 3:21	5:12 3:44	5:40 4:03	5:48 4:20	6:02 4:36	6:18 4:50	6:32 5:04	6:44 5:17	6:56 5:28		
C	1:09 0:10	1:57 0:55	2:28 1:30	2:58 2:00	3:20 2:24	3:43 2:45	4:02 3:05	4:19 3:22	4:35 3:37	4:49 3:53	5:03 4:05	5:18 4:18	5:27 4:30			
D	0:54 0:10	1:29 0:46	1:59 1:16	2:23 1:42	2:44 2:03	3:04 2:21	3:21 2:39	3:36 2:54	3:52 3:09	4:04 3:23	4:17 3:34	4:29 3:46				
E	0:45 0:10	1:15 0:41	1:41 1:07	2:02 1:28	2:20 1:48	2:38 2:04	2:53 2:20	3:08 2:35	3:22 2:48	3:33 3:00	3:45 3:11					
F	0:40 0:10	1:06 0:37	1:29 1:00	1:47 1:20	2:03 1:36	2:18 1:50	2:34 2:08	2:47 2:19	2:58 2:30	3:10 2:43						
G	0:38 0:10	0:58 0:34	1:19 0:55	1:35 1:12	1:48 1:28	2:05 1:40	2:18 1:54	2:29 2:05	2:42 2:18							
H	0:33 0:10	0:54 0:32	1:11 0:50	1:25 1:05	1:39 1:19	1:53 1:31	2:04 1:44	2:17 1:56								
I	0:31 0:10	0:48 0:29	1:04 0:46	1:18 1:00	1:30 1:12	1:43 1:25	1:55 1:37									
J	0:28 0:10	0:45 0:27	0:59 0:43	1:11 0:55	1:24 1:08	1:36 1:19										
K	0:26 0:10	0:42 0:26	0:54 0:40	1:07 0:52	1:18 1:03											
L	0:25 0:10	0:39 0:25	0:51 0:37	1:02 0:49												
M	0:24 0:10	0:36 0:24	0:48 0:35													
N	0:23 0:10	0:34 0:23														
O	0:22 0:10															
Z																

SIMPLIFIED REPETITIVE DIVE TABLE

1-13 (1-8)

Depth (feet)	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190
A	7	6	5	4	4	3	3	3	3	3	2	2	2	2	2	2
	193	94	55	36	36	27	22	17	12	7	8	3	3	3	3	1
B	17	13	11	9	8	7	7	6	6	6	5	5	4	4	4	4
	183	87	49	31	32	23	18	14	9	4	5	0	1	1	1	1
C	25	21	17	15	13	11	10	10	9	8	7	7	6	6	6	6
	175	79	43	25	27	19	15	10	6	2	3					
D	37	29	24	20	18	16	14	13	12	11	10	9	9	8	8	8
	168	71	36	20	22	14	11	7	3							
E	48	38	29	26	23	20	18	18	15	13	12	12	11	10	10	10
	151	62	30	14	17	10	6	4								
F	61	47	36	31	28	24	22	20	18	18	15	14	13	13	12	11
	139	53	24	19	12	6	3									
G	73	56	44	37	33	29	26	24	21	19	18	17	16	15	14	13
	127	43	16	13	8	1										
H	87	66	52	43	39	33	30	27	25	22	20	19	18	17	16	15
	113	34	8	7	2											
I	101	76	61	50	45	38	34	31	28	25	23	22	20	19	18	17
	91	24														
J	118	87	70	57	49	43	38	34	32	28	26	24	23	22	20	19
	88	11														
K	136	98	78	64	54	47	41	38	35	31	29	27	25	24	22	21
	62	1														
L	161	111	86	72	61	53	48	42	39	35	32	30	28	26	25	24
	39															
M	187	124	97	80	68	58	52	47	43	38	35	32	31	29	27	26
	11															
N	217	142	107	87	73	64	57	51	45	40	38	35	33	31	29	28
O	241	180	117	96	80	70	62	55	50	44	40	38	36	34	31	30
Z	270	200	124	101	84	73	64	57	52	46	42	40	37	35	32	31

NEW GROUPS

BLACK NUMBERS are "Residual Nitrogen Times"-time in minutes that a diver is to consider that he has already spent on the bottom when he starts a Repetitive Dive.
WHITE NUMBERS are bottom time limits in minutes for No Decompression Dives.

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TABLE 1-10 (1-5) U.S. NAVY
Standard Air Decompression Table.
(Simplified for the Sport Diver)

Depth (feet)	Bottom Time (min)	Decompression stops (min) 20 (ft)	10 (ft)	Repetitive Group
40	200		0	(*)
	210		2	N
	230		7	N
50	100		0	(*)
	110		3	L
	120		5	M
	140		10	M
	190		21	N
60	60		0	(*)
	70		2	K
	80		7	L
	100		14	M
	120		26	N
	140		39	O
70	50		0	(*)
	60		8	K
	70		14	L
	80		18	M
	90		23	N
	100		33	N
	110	2	41	O
	120	4	47	O
	130	6	52	O
80	40		0	(*)
	50		10	K
	60		17	L
	70		23	M
	80	2	31	N
	90	7	38	N
	100	11	46	O
	110	13	53	O
90	30		0	(*)
	40		7	J
	50		18	L
	60		25	M
	70	7	38	N
	80	13	48	N
	90	18	48	O
100	05		0	(*)
	30		3	I
	40		15	K
	50	2	24	L
	60	9	29	N
	70	17	39	O
110	20		0	(*)
	25		3	H
	30		7	J
	40	2	21	L
	50	8	26	M
	60	18	36	N
120	15		0	(*)
	20		2	H
	25		6	I
	30		14	J
	40	3	25	L
	50	15	31	N
130	10		0	(*)
	15		1	F
	20		4	H
	25		10	J
	30	3	18	M
	40	10	25	N
140	10		0	(*)
	15		2	G
	20		6	I
	25	2	14	J
	30	3	21	K
150	5		0	C
	10		1	E
	15		3	G
	20	2	7	H
	25	4	17	K
	30	8	24	L
160	5		0	D
	10		1	F
	15	1	4	H
	20	3	11	J
	25	7	20	K
170	5		0	D
	10		2	F
	15	2	5	H
	20	4	15	J
180	5		0	D
	10		3	F
	15	3	6	I
190	5		0	D
	10	1	3	G
	15	4	7	I

*See table 1-11 (1-6) for Repetitive Groups in "No Decompression Dives."

"NO CALCULATION" DIVE TABLES

INSTRUCTIONS FOR USE

For a "no-decompression" dive:

1. Find the depth you have dived along the top of Table 1-11.
2. Drop down to the figure which denotes your Bottom Time.
3. Go across to the right to Table 1-12.
4. Follow the arrow upward until you find the time spent out of the water since the last dive (Surface Interval).
5. Go across to the right to find the allowable Bottom Time (white numbers) for the next dive. These are listed under the appropriate depths at the top of each column.
   The Black Numbers are "Residual Nitrogen Times" and are only important for figuring "Decompression" Dives.
6. If the "no decompression" limits are exceeded, go to Table 1-16 for Decompression stops and times.

Use of Table 1-10

a) All decompression stops are timed in minutes.
b) Ascent rate is 60 feet per minute.
c) The chest level of the diver should be maintained as close as possible to each decompression depth for the number of minutes listed.
d) The time at each stop is the exact time that is spent at that decompression depth.

DEFINITIONS:

1. Bottom time (in minutes) starts when the diver leaves the surface and ends only when the diver starts a direct ascent back to the surface.
   Always select the exact or next greater bottom time exposure.
2. Depth (in feet) The deepest depth of descent. Always enter the tables on the exact or next greater depth reached.
3. Residual Nitrogen Time—Time in minutes that a diver is to consider he has already spent on the bottom when he starts a repetitive dive.

PLAN YOUR DIVE—DIVE YOUR PLAN

Always carry the Dive Tables on a dive—they may save your life.

DIVE	DEPTH	BOTTOM TIME	ARRIVAL TIME AT SURFACE	DEPARTURE TIME NEXT DIVE
1st				
2nd				
3rd				
4th				

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SEA-STING KIT

INSTRUCTIONS FOR USE

An Outline for
First Aid Treatment
in Underwater Hazards

by

S. Harold Reuter, M.D.
Houston, Texas

Model SSK

DACOR CORPORATION
161 Northfield Road
Northfield, Ill 60093 USA

CONTENTS OF SEA-STING KIT

1. Toxin Neutralizer Sting Kill Swabs, Benzalkonium Chloride, Triethanolamine Glycerol, Propylene Glycol
2. Antiseptic Hexachlorophene Germicidal Soap.
3. Gauze Scrub Pads – Sterile
4. Ointment: Special Sea-Sting Antiseptic–Analgesic-Antihistamine Ointment
   - Procaine HCL
   - Trichloro-Diphenyloxide
   - Allantoin
   - Pyrilamine Malleate
   - Base: Water Insoluble
5. Instruction Booklet.

PURPOSE

A. The Sea-Sting Kit was assembled to supplement the diver's regular first aid kit. It is to be used specifically to treat venomous stings, bites and mechanical trauma.

B. The Sea-Sting Kit provides a triple chain of germicidal effectiveness when used in the **EXACT** order outlined in the directions. Any deviation from the specified order of treatment will result in less than optimal effectiveness in the chain of three germicidal actions. By combining the three types of antiseptics, a broad spectrum effect results which will combat the large variety of organisms most frequently encountered in the marine environment.

DIRECTIONS

The following are general instructions for the use of the SEA-STING KIT.

Specific considerations dependent upon the type of marine hazard encountered will be elaborated upon in the following pages.

The wound should first be flushed with seawater and cleaned of debris.

Step No. 1:

To use Toxin Neutralizer grasp vial (over orange cap) between thumb and forefinger. Exert force until internal separator inside vial crushes. You will hear popping noise and will feel separator give way. Remove orange cap. Do **NOT** remove cotton swab. Squeeze vial until fluid thoroughly wets cotton. Continue squeezing as you use.

Apply Toxin Neutralizer gently with the Sting-Kill Swab. Wait 2 to 3 minutes before proceeding with the next step.

Step No. 2:

The wound should be thoroughly scrubbed with the antibacterial soap using the sterile gauze pad.

Step No. 3:

Sea-Sting Ointment should be applied to cover the wound.

It is most important for maximum effectiveness to follow these steps in the **EXACT** order outlined.

If the SEA-STING KIT medications accidently get in the eyes, flush the eyes well with water and if irritation persits, counsult a physician.

VENOMOUS & TOXIC MARINE ANIMALS

1. Venomous Invertebrates (Animals with no backbone).

A. COELENTERATES

Over 90% of the venomous wounds and stings suffered by the diver are from members of this phylum. All members have stinging cells called nematocysts which contain a coiled threat with a sharp point through which it injects its venom.

There are three classes of Coelenterates:

Class 1: Hydrozoa

The Hydroids include the very numerous feathery-like tiny structures which have a plant-like appearance. Fire coral, which is not a true coral, and the Portugese Man-of-War, which is mistaken for a jellyfish, are in this class.

Class II: Scyphozoa

These are the true jelly fishes which are all free-floating ranging in size from invisible to the large medusa.

Class III: Anthozoa

Includes the sea anemones and true corals.

Since the tentacles of the members of this phylum may have thousands of nematocysts which continuously inject their venom while in contact with the skin, prompt removal with the gloved or otherwise protected hand is essential. This should be done with the greatest of care to

prevent the firing of undischarged nematocysts. Never rub the tentacle off the skin. The Sea-Sting Kit neutralizer, alcohol or formaldehyde will inactivate undischarged nematocysts. Diving after a storm may be dangerous since tentacles can be broken off the animal and be encountered unnoticed and free-floating in the water. The nematocysts in this form, or when washed up on the beach, are capable of discharging for long periods of time with toxic effects.

Coral cuts should be scrubbed very thoroughly to remove all foreign particles. Untreated coral cuts can result in serious ulcers which may take months to heal. Elevation of an involved limb is strongly advised.

Adolph's Meat Tenderizer which contains the enzyme, Papain, has been reported to relieve the stings of Chesapeake Bay Sea Nettles and Jellyfish. Since the Papain enzyme breaks down the toxic protein, I have successfully used and recommended this enzyme for many years for most stinging marine wounds, especially from the Coelenterates, since these toxins are all proteins. Occasionally, a skin irritation may develop from the Papain enzyme.

B. ECHINODERMS

Few divers escape at least one encounter with the sharp penetrating spines of the Sea Urchin. Spines of some species will dissolve with little more problem than pain; however, most spines will be the source of irritating discomfort for many weeks or months. These should be removed with a fine tweezer or small needle. Care should be taken to pull them straight out since they are extremely brittle and easily fragmented.

C. ANNELIDS

(Segmented Round Worms)

The Bristle worm injects venom through its hollow harpoon-like bristles or setae. Numerous of these are embedded in the skin when the worm is touched. Prompt and complete removal with adhesive tape is recommended.

II. Venomous Vertebrates (Animals with a backbone).

ELASMOBRANCHS

(Includes the venomous rays)

Tissue damage of long duration can result from the double tooth saw-like stinger located at the base of the tail. This bone-like structure lies in a canal which is bathed by a strongly alkaline sticky liquid. Because of the alkalinity of the toxin, it is most important to omit the use the the Sting-Kill toxin neutralizer since it is also alkaline.

The wound should be immediately and thoroughly cleaned of all pieces of the integumentary shaath which surrounds the barb and is often left in pieces in the wound. Since the toxin is destroyed by heat, the treatment of choice is to immerse the wounded area in water as hot as can be tolerated for 30 to 90 minutes. This is followed by elevation of the limb. Heat treatment is also recommended for wounds of the Scorpion Fish family. Soaking the wound with 1% Lactic Acid or Vinegar (acetic acid) will help to neutralize the alkaline venom. Since the pain is usually excruciating, prompt attention to treatment is necessary and will result in rapid relief.

In addition to the venomous stings the Sea-Sting Kit is quite effective for all types of traumatic injuries such as cuts and scrapes from equipment, the boat or barnacles.

GENERAL CONSIDERATIONS

1. The Sea-Sting Kit was formulated to supplement the well stocked first aid kit which all divers should carry. It was designed for on-the-spot emergency care or first aid. In some cases it may be necessary to consult a qualifed physician.
2. Very few antidotes are available for marine toxins. Most treatment consists of treating the symptoms.
3. All divers are advised to maintain their tetanus booster immunization.
4. The diver's regular first aid kit should include:
   (1) A small brush similar to those used for cleaning finger nails to help scrub deep wounds.
   (2) A fine-tipped, good quality tweezer.
   (3) A small pointed probe or pin to dislodge splinters and spines.
5. Prevention is far more successful than treatment. For this reason it is better to dive with the protection of a one piece jump-suit with long sleeves. Gloves such as workmen use with a wide sturdy wrist band and rock boots protect the areas most frequently injured. A full wet suit in cold water provides the same protection.

I offer one reference which I consider to be the classical and most complete source of information: Dr. Bruce W. Halstead's three volume set entitled "Poisonous and Venomous Marine Animals of the World".

One last word of caution: When you are diving and come across an unfamiliar object or animal, leave it alone – do not handle or disturb it.

95% of Divers' Ear Problems 'Start in Eustachian Tube'

MANY OF THE traditional notions about the hearing problems of scuba divers "need revising," a Houston otolaryngologist told the recent Third International Conference on Underwater Education in Dallas. Whether they are aficionados of the sport or mere beginners, "the real source of trouble for most divers is the eustachian tube," reported Dr. S. Harold Reuter, a member of the board of directors of the American Medical Scuba Diving Association and an internationally recognized underwater photographer.

"It is a myth," Dr. Reuter emphasized, that the high-tone hearing loss frequently experienced by seasoned divers results from thickening of the ear drum due to repeated cold water exposure and pressure change. And the standard head-first descent, he added, "is potentially dangerous and should be replaced by the safer feet-first position."

Eustachian Tube Troubles

Actually over 95 percent of the medical problems encountered by divers are associated with difficulty in inflating the eustachian tube, "and the greatest single problem is middle ear squeeze – which is simply the result of failure to clear the eustachian tube and inflate the middle ear," said the clinical instructor in otolaryngology at Baylor College of Medicine.

The problem during any descent, Dr. Reuter explained, is to equalize the reducing pressure in the middle ear with the progressively increasing pressure from the surrounding water – "and this must be done by getting air up through the eustachian tube."

If the pressure is not equalized, he warned, the tympanic membrane retracts and there is outward displacement of the stapes footplate. When the resulting pain forces the diver to equalize the pressure, "which he will usually do by the Valsalva maneuver," the sudden inward pressure change on the footplate is transmitted as a shock wave through the fluids of the inner ear. "And it is the shearing force of this pressure wave, combined with possible hemorrhage from torn blood vessels," he pointed out, "that causes permanent damage to the sensory receptors of the cochlea."

Most of the problems, however, could be averted if divers followed a few simple rules, Dr. Reuter suggested. No one with an upper respiratory tract infection should dive, he stressed. And anyone who has trouble clearing the eustachian tube should use both a topical nasal decongestant and a systemic decongestant 20 minutes prior to a dive. (AFRIN®)

"But any new medication prescribed for a diver," he cautioned, "should be used first on a trial basis for at least 24 hours before a dive. This way, if he is the rare individual who develops an idiosyncratic reaction to the medication, at least the reaction will not occur in the watery depths where it could prove disastrous."

A pioneer in the "feet-first" school of diving, the Houston specialist suggested that divers be lured away from the traditional head-dive "because it puts the head in a dependent position and that invariably brings on vascular congestion in the eustachian tube membranes."

Training to Inflate Tube

There would also be less middle ear barotrauma, he added, if divers were trained to self-inflate the eustachian tube every two or three feet of descent, beginning from the moment of entry into the water. For most divers, he pointed out, "that simply means learning to push the face mask tightly enough against the nose to block it off, or to hold the nose tightly while blowing against the closed glottis."

And, "despite notions to the contrary," the medically sophisticated diver is troubled with middle ear problems "almost as frequently as the uninitiated." Twenty-four of 40 physicians attending a course in the Bahamas last spring to qualify in diving medicine, Dr. Reuter found, "had otoscopic evidence of middle ear barotrauma."

Sponsored by the National Association of Underwater Instructors, the course – the first of its kind ever given – may also have provided a measure of physicians' growing interest in the underwater world. "Because of space limitations," Dr. Reuter said in an interview with CLINICAL TRENDS, "only 40 physicians could be admitted – but *over* 300 applied."

*Permission to use these articles, charts, and forms was given by Dr. Harold Reuter.

Reprinted From—*Clinical Trends in Ophthalmology, Otolaryngology and Allergy*; Vol. 10, No. 3 – Oct.-Nov. 1971

THE HOUSTON UNDERWATER CLUB, INC., is an active club with a diverse membership bound together by our common interests in sport diving, and the underwater world. Underwater archaeology, spearfishing, shell and coral collecting, aquarium stocking, photography, oceanographic studies, diving safety and dive training are some of the interests of our members. . . . . Our activities are as diverse as your interests. . . with an annual International Film Festival, shell collecting trips, week-end diving in the Gulf and lakes, spearfishing contests, a national educational seminar on diving, flights to the Carribean for tropical diving, any activity related to the underwater. . . . .Because people with common interests become friends, we also have an active schedule of social get-togethers.

MEMBERSHIP AND DUES. . . . .Any certified diver is eligible for a DIVER membership with dues of $12 per year. . . . . .Family membership is also available for an additional $3 per year, which includes the immediate family of a diving member, entitling them to participate in all club activities. . . . with the exception of voting privileges. New members pay only for the remaining months of the year, at the rate of $1.00 per month for single diver membership or $1.25 per month for family membership. . . . . HUC sponsors a chapter of the Underwater Photography Society and membership is available for $3 per Calendar year. . . . . The completed application blank and dues should be delivered. . . . or mailed to the Secretary — HOUSTON UNDERWATER CLUB, INC. P.O. Box 27035 — Houston, Texas 77027.

MEETINGS. . . . . Held at the Community Room of the Mercantile Bank—4010 S. Braeswood (at Stella Link) May through October — 1st Wednesday and 3rd Thursday of the month. November through April — 3rd Thursday of the month. The program begins at 7:30.

FOR MORE INFORMATION — Call the Club phone 464-1010, or come to the next meeting. Guests are always welcome.

Vocabulary

The following words should be introduced or re-emphasized before showing the slide/tape, "Is Marine Science in Your Future?"

1. archeologist
2. geologist
3. biologist
4. environment
5. ecology
6. physics
7. scuba
8. surgeon
9. snorkel
10. technician
11. aquarium
12. algae
13. sterilizer
14. oceanography
15. cauldron
16. commercial
17. apprentice
18. periodical
19. symposium
20. categories

SLIDE AND TAPE PRESENTATION
MARINE SCIENCE

- - - Mary Elizabeth Schell

Is Marine Science In Your Future?

Prologue

Slides	Tape — Narration and Music
For the narrations in Nos. 1—12; use thought provoking pictures (some may be borrowed from the United Fund); stay no longer than 20 seconds on a picture.	1. Where am I going? What will I find?
	2. What's in this grab bag that I call my mind?
	3. What am I doing alone on the shelf?
	4. Ain't it a shame? But no one's to blame but myself.
	5. Which way is clear when you've lost your way year after year?
	6. Do I keep falling in love just for the kicks of it — staggering through the thin and thick of it?
	7. Hating each tired trick of it! Know what I am — I'm good and sick of it.
	8. Where am I going? Why do I care?
	9. When it's foul, run where it's fair.
	10. No matter where I run, I meet myself there. Looking inside me, what do I see?
	11. Anger and hope and doubt. What am I all about?
	12. Where am I going, and where are you going? In junior high Occupational Orientation classes, we have time set aside to make goals and plan ahead *now*. A series of now experiences will become your future, so let's look in on some exciting careers and see whether we might get involved now.
Girl in Scuba Gear	13. Well, how about that, and where are you going? Maybe toward Marine Science careers? Would you like to come along?
Title Slide	14. Is Marine Science in your future? Do you like water activities?
Surfers	15. We have already agreed that one should enjoy the water if he wants Marine Science for a career. This means keeping yourself in good health, mentally and physically.

Fish Imprint in Rock	16. You need lots of curiosity. Maybe this picture shows just a dent in a rock, but to an archeologist, a geologist, or a biologist, it is a history of the past. It helps us understand the present and improve the future.
Woman at Microscope	17. A Marine Science career means patience in collecting and classifying likenesses and differences. Sometimes this is done even with a microscopic specimen.
Man in Whale	18. A Marine Scientist must continually gain knowledge and respect for *all* sizes and all shapes of sea life.
Underwater Plant	19. Plants are a vital source of oxygen as well as a thing of beauty. Did you know that over 80 percent of our oxygen comes from plants in the ocean? Much work is now being done to introduce edible sea plants to all mankind. There is enough nourishing food in the sea for all the world to enjoy well-balanced meals.
Underwater Plant	20. A Marine Scientist has a love of beauty, a concern for mankind and a desire to keep a balanced environment. This means he is interested in ecology.
Pressure Chart	21. To go underwater, a diver must have a knowledge of the laws of physics. When time and pressure are upon you, you just can't fool around with mother nature. This simplified chart was recently calculated by Dr. Reuter. You will meet him later.
Underwater Chart	22. To get pictures like these, the photographer has a love of nature, patience, an artistic eye, and a lot of self-discipline. Let's take a look at people who meet these requirements.
	Scene II
Dr. Reuter	23. Meet Dr. Harold Reuter (Rōōter) — a prominent ear, nose, and throat specialist in Houston. When he was in junior high school, he started photography as a hobby. He won a prize with a picture of a microscopic animal. About five years ago he began scuba diving as a hobby. The letters in the word SCUBA mean Self-Contained Underwater Breathing Apparatus. Scuba diving is a very safe recreation because a person cannot buy or rent the tanks until he is trained, tested, and certified, so there is seldon an accident.
Dr. Reuter at Chart	24. As Dr. Reuter goes from the surgeon's gown to the scuba gear, he finds recreation and relaxation. Knowledge from his vocation, or career, as a physician spills over into his avocation, or hobby, of diving. Observations in the operating room and underwater have tied together to bring new methods that solve medical problems of the ear and underwater pressure charts of the diver.

Scene III

Diver in Suit

25. The number of careers in dive shops is increasing rapidly in response to the thousands of people joining dive clubs for recreation. Mr. Nyle Everitt, general manager of the dive shop at Scuba Incorporated, said the shop owners are divers themselves and believe in their work because they are active in the sport. That is why scuba diving equipment is never sold or rented until the customer presents a C card to show he is ready to plan his dive and dive his plan.

Diver

Mr. Everitt says no law has been needed to force Dive Shops into requiring a C card for Scuba tanks. The dive owners are so much a part of the sport that they want it to be safe for everyone.

Underwater Picture of Diver

26. You probably are wondering how to acquire skills that would certify *you* for scuba diving and what this would cost. If you are a good swimmer, your next step would be lessons in skin diving. This means about $10 for instructions. Check with the YMCA or look under "diving" in the yellow pages. You will need a mask, fins, and a snorkel. Total cost of this equipment is $25 to $30. A snorkel is a lightweight, unattached tube used for breathing underwater.

Scuba Diver

27. After completing the skin diving, scuba lessons can be taken for about $50.

Underwater Picture

28. The pleasure in underwater recreation often leads to careers in marine research. Come with me now to an Oceanography Laboratory.

Scene IV

Door of Oceanography Center

29. On the campus of Westbury High School is a very special building — the Oceanography Center. Here the staff collect and distribute living marine species to all the schools of the Houston Independent School District. Mrs. Lou Harris is a dedicated technician. There are others who give valuable assistance, but this story will center around Mrs. Lou Harris.

Mrs. Lou Harris

30. Here she is, Mrs. Lou Harris, the kind of mother who allowed her children to bring snakes into the house. She began working at the Oceanography Center as a volunteer — no pay — just love of marine life. Later she was paid as a part-time employee and finally assigned as full time technical consultant.

Mrs. Harris Feeding Fish

31. She very patiently hand feeds each fish. They are wild until they are trained.

When a fish is very shy, Mrs. Harris warns the visitor to stand back so the fish will come to her.

Mrs. Harris	32. She reads and keeps data. Every aquarium has a special story that Mrs. Harris relates to visitors. For example, there is an edible clam brought in from Galveston. This clam has its own special filter system.
Mrs. Harris at Valve	33. She carefully regulates the sea water and checks the algae to be sure it is present just as it is in salt water.
Mrs. Harris and Crab	34. Notice the Stone Crab. See one large claw? If you snap it off, it will grow back. Snapping off only one claw at a time is a state law in Florida. Can you think of a reason for this law? (Turn off recorder and projector if discussion begins)
Sterilizer	35. Here is the sterilizer she uses to keep out all unwanted bacteria.
Shell Collection	36. Notice the shell collection; finding and classifying can be a rewarding hobby that leads to knowledge.
Mrs. Harris and Trophies	37. Mrs. Harris was very modest about dozens of trophies. She preferred talking about the flowershaped animals called sea anemones or the pistol shrimp that kept demanding her attention with his loud pops.
Mrs. Harris and Trophies	38. Mrs. Harris finally was persuaded to tell about her trophies if it could interest students in hobbies. She and her husband have won many trophies in rallying. This is a contest that requires that a sports car must be driven to a certain spot in a certain length of time. One second more or less than required by the contest rules is a stiff penalty. This means putting math into practical use, for it ties in with her love of science. In her words, "Nature is the real mathematician."
Mrs. Harris	She takes pride in her career and her hobbies. She taught her own children and now wants to help other students understand the total environment as it all relates to human beings.
Oceanography Center Scene	39. It has been great to be a part of the excitement of the Houston Independent School District's Oceanography Center. Let's go now to see an annex being built for the center.
	Scene V
Community Workers at Work on a Greenhouse	40. The community workers here are giving their time free of charge. They want a place for the plants that will grow for research studies.

More Greenhouse Workers

41. Mr. Louis Evans, a shop teacher, is in charge of this project. He, too, is giving freely of his time and talent because he cares about teenagers and their desire to grow marine plants in a greenhouse.

Portable Welding Machine

42. Notice the portable welding machine? That is an expensive piece of equipment, but Shell Oil Company let the volunteer workers use it free of charge. Just another example of doing something extra to make life a little better.

Door of Oceanography Building

43. As we leave the Oceanography Center, we remember a quotation that this team of researchers lives by. It is from Sir Isaac Newton who said, "great ideas emerge from the common cauldron of intellectual activity and are rarely cooked up in private kettles from original recipes. If I have seen farther than others, it is by standing on the shoulders of giants." As we say goodbye to the research team, we go to another field of careers in marine science.

Scene IV

Tall Tank—Ocean Corp.

44. This is a part of a commercial diving school called Ocean Corporation. It is located at 2120 Peckham in Houston.

Ocean Corp.

Mr. John Choate, registrar for the commercial diving center, very generously shares pictures and information about career opportunities in diving for industry.

Ocean Corp.

45. Commercial diving is a strenuous, hard skill. It requires self-discipline, exactness, and lots of times there are many hours of waiting for the action to take place.

Ocean Corp.

46. A class lasts 14 weeks, and at present, July, 1972, the cost is $1250. About ten or twelve divers are in each class.

Ocean Corp.

Of the ten or twelve men all could be hired for excellent wages if they wanted the work, but records show that usually 3 or 4 are very ambitious in each class; 3 or 4 are wishy-washy; one really does not want to work, and one does not want to leave Houston.

Ocean Corp.

47. Most of the opportunities are on offshore oil rigs off the coast of southern Louisiana. There are excellent salaries and many jobs for men with mechanical skills.

Ocean Corp.

48. Pipefitters, welders, electronic experts, blasting crews, and many other craftsmen are needed by oil, construction, and salvage companies.

Ocean Corps Tender

49. An apprentice to a diver is called a tender. That is because he "tends" to the needs of the diver. He takes care of equipment, sets up equipment, and helps the diver get in and out of the water. The present salary for a tender is $2.50 to $3.00 per hour. When he proves his ability, he can move up to a diver with a very high salary. Within 3 or 4 years, a good diver can save enough money to open his own venture.

Ocean Corps Woman

50. Women are not overlooked at Ocean Corporation. They are trained for sports diving, instructing, and research. The "Diving Dames," as one of their clubs is called, must pass rigid tests at Lake Travis or Canyon just as the men do. The laws of pressure under water make no exceptions; so women's lib need not strike here.

Scene VII

National Marine Service

51. Now we journey on to another area of Marine Science careers. National Marine Service has a new Houston office at the corner of West T. C. Jester and Dacoma. In the next 10 years, the Coast Guard has predicted that Marine Service will increase 80 to 100 percent.

National Marine Service

52. Here men are employed to provide water service to oil companies.

Mr. R. L. Miller, the office manager of National Marine Service, said jobs are divided into 2 main categories. They are operational and traffic.

National Marine Service

53. Operational jobs include engineers who write specifications to the shipyards who build their vessels. Also included are technical workers for electrical and communication experts. Operational jobs also mean opportunities for a crew of operators and repairmen.

The entry job is a deck hand, and his pay begins at $25.50 per day as of July, 1972. These men may advance to deck hand tanker men at $30.00 per day, a pilot on a canal makes $39.00 per day, and a pilot on a river makes $57.00 a day. The river assignments take more skill than those on the canals.

National Marine Service

54. The river boat crew works 30 days and is off 15 days. The canal crew works 20 days and is off 10 days. This means crewmen and their families must adjust to being separated many days each year.

The Seafarers International Union represents the crews of operators.

National Marine Service

55. The other field of careers in Marine Service is involved in traffic. This means jobs in ratemaking, marketing, and sales. It also means dispatchers and clerical help.

This completes our study of on-the-job interviews in recreation, research, production, and service for Marine Science. Now let's have fun and relax with a show about Marine Science.

Scene VIII

Entrance to Sea Arama	56. Now we are entering Sea Arama in Galveston.
Sea Arama Drive	57. The show has a trained whale who refuses to take his shot.
The Sea Lion	58. Another trained marine actor is Heidi — the Sea Lion.
The Flying Whale	59. Notice the school behind the flying whale? The marine animals pretend to be nursery school children who get promoted and go through elementary, high school, and college. It's a play that keeps you laughing and applauding.
Beach	60 Sea Arama was lots of fun; then we decided to go surfing and beach combing. It was a wonderful day. Now we head home; we plan to stop by the library for Marine Science books.
Library	61. What luck! As we enter the Oak Forest Library, there are displays of Marine Books everywhere — even in the children's department.
Magazines	62. In the periodical section, we find many marine magazines for pleasure and for references.
Magazines	63. Here is an article in the June issue of Texas Parks and Wildlife. It is about Dr. Harold Reuter's hobby. Another article in the July issue of the Harvard Medical Journal is also about Dr. Reuter's latest contributions to medical research.
Houston Underwater Club	64. Our eyes focused on the Houston Underwater Club. When we called Mr. Larry Evans, he was willing to share many slides. This is a picture of the usual activities when the club takes a trip into the world underwater.
Queen Angel	65. This is a sample of Mr. Evans' work. It is a Queen Angel. Mr. Evans is fast becoming an authority on underwater photography. He is now making an underwater movie just off the coast of Galveston.
"Feather Duster"	66. This is a close-up of a plume of worm feather duster. Mr. Evans is completing his doctors degree in chemical engineering at Rice, but his career is turning more and more toward his hobby — photography.
Film Festival Ad	67. He invites you to come to the Film Festival to be held at Jones Hall on October 28 and 29. Mr. Evans is chairman of Sea Symposium '72, which will also be at Jones Hall on October 28 and 29. You will enjoy some of the discussions. A symposium is a collection of ideas and discussions. Mr. Evans shared many beautiful slides with us.
Two Divers Ascend	68. Now we see him and his buddy ascending to the surface.

69. It's time for us to come back to the surface, too, and review Marine Science Careers.

Scene XI

70. As we look back over the 4 main categories of jobs, we find much overlapping with all underwater careers — especially recreation and research production.

    The fields of production and services are also closely related. No man is an island in marine careers or in any other field.

    Let's think back on our opening song — "Where Are You Going?" Do you want to qualify for careers in Marine Science?

71. The time of decision — Do you like the water? Are you curious and patient? Do you like math, science, and mechanical things? Is Marine Science right for you? Put this new frontier into your dreams if you like, but. . . .

Epilogue

Group of Happy People

72. No matter what career you choose, keep thinking about *your good* qualities, *your strong* points and remember. . . "I Gotta Be Me"

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Houston Chronicle
Nov. 12, 1972

PREDICTIONS

In order to meet the growing demands of the world population, more and more people are needed to discover and market the sea's resources. Scientific research of the sea includes not only methods of preserving and using sea life but also inexpensive ways to extract pure drinking water from the salty ocean water.

New equipment will be needed to increase research. New minds and strong bodies will be essential in undersea technology.

An announcement from the U.S. Civil Service Commission issued in September, 1970, states, "The Big Pond" with its broad scope and tremendous diversity, gives you elbow room, a chance to concentrate on the kind of activity that really interests you.... If you measure up to the challenges of Government work, you'll find there's plenty of opportunity to be a *big* fish in the Big Pond.[1]

Marine Science research requires serious studies in the fields of science and math. When you are high senior, you may be able to obtain a government scholarship to study oceanography or related engineering. Write the college of your choice for scholarship opportunities. In your last year of college, decide on the geographic location in which you prefer to work. Write a letter of application to the address of your choice. There will be increasing opportunities in Marine Science by the time your graduate.

---

[1] Federal Jobs in Engineering Physical Sciences and Related Professious announcement No. 424, September, 1970 U. S. Civil Service Commission, Bureau of Recruiting and Examining.

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ZOOLOGICAL SOCIETY
Contact: R. L. Smith
621-7822

MARINE SCIENCE RESOURCES

Speakers

Mr. Nyle Everitt 526-8957
Scuba Incorporated
Houston, Texas

Mr. Larry Evans 526-4141
Rice University
Houston, Texas

Dr. Harold Reuter 524-1831
Hermann Professional Building
Houston, Texas

Mrs. Marge O'Meara 464-1010
Houston Underwater Club
or Home 209 Gessner 464-6622
Houston, Texas 77024

Miss Evelyn Brown 666-8478
Biologist in Cardiovascular Research for NASA; Also Peace Corps Information

Mr. William Perlmutter 664-4155
Scuba Instructor and Real Estate Broker

Mr. William Cox 861-5352
Ninth grade student at Hamilton Junior High School
He is a Safety Scuba Diver.
1522 Droxford Lane
Houston Texas 77008

MARINE SCIENCES
Media

FILM	*NUMBER*	*TIME*
Seacoast People (non narrative) Sterling Educational Films	M-5314	14¼ min.
The Coral Reef Walt Disney production of the variety of plants and sea life	L-4535	17 min.
Exploring the Ocean Uses animation to explain how all life in ocean depends on plant life	4597	11 min.
The Many Moods of Padre Island A National Park that offers oceanographic study	L-4410	24 min.
New England Fishermen Outlines problems and pleasures of fishing industry	M-4468	11 min.
Sulphur Mine at Sea Procedures in Off-shore mining in the Gulf of Mexico	M-4414	19 min.
Castles in the Sea Describes habits of snails	L-4780	24 min.
Japan Harvests the Sea Daily work in a fishing village	L-4898	29 min.
Mosses, Liverworts and Ferns Closeups	M-5043	14 min.
Sounds in the Sea Use of the hydrophone in WWII led to research of fish and mammals	M-4927	16 min.
Strange Partners *(Symbiosis in the Sea)* Relationships of Marine animals in cleaning, making homes and entertaining	M-4993	12 min.
To Catch a Meal/Feeding in the Sea (Variety of marine feeding techniques)	M-4994	13 min.

Transpariencies

Marine Science Careers — 4TR

Slide-Tape Presentation

"Is Marine Science in Your Future?"—80 slides with tape, about 25 minutes by M. E. Schell
"Underwater Pictures" — Reproductions of winning slides made by Mr. Larry Evans and Dr. Harold Reuter.

PRINTED BIBLIOGRAPHY

American Oceanography, "Newsletters" the American Society for Oceanography, 854 Main Bldg., Houston, Texas 77002

Dive Magazine, 8490 Sunset Blvd., Los Angeles, California

Monda Sommerso, Etas Kompass Publicita, 20122 Milano, Rome, Italy

Oceanography — A Course of Study in Marine Science. Bulletin No. 68CBM40. Houston Independent School District, Houston, Texas, 1969.

"Sea Education" by Carroll G. Fader. *Today's Education*, December, 1970. NEA Journal, 1201 16th Street, N. W., Washington D.C. 20036, pp. 30-31.

Skin Diver Magazine. P.O. Box 7765, Long Beach, California

"The Problems and Techniques of Underwater Photography" by S. Harold Reuter, M.D.. Reprinted from the *Journal of the Biological Photographic Association*, July, 1971.

The Silent World by J. Y. Cousteau. Harper, New York, 1953.

The Waterways Journal, 701 Chemical Bldg., St. Louis, Mo. 63101.

U. S. Navy Diving Manual Compiled by the Government Printing Office, Washington D.C., 1970.

World Beneath the Sea by James Dugan Published by the National Geographic Society, 1967, Washington, D.C.

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